Human Errors in Decision Making

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"Analysis of historical cases"

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Abstract— the aim of this paper was to identify human errors in decision making process. The study was focused on a research question such as: what could be the human error as a potential of decision failure in evaluation of the alternatives in the process of decision making. Two case studies were selected from the literature and analyzed to find the human errors contribute to decision fail. Then the analysis of human errors was linked with mental models in evaluation of alternative step. The results of the study showed that five human errors occur in the evaluation of alternatives step; ignorance or neglect, overconfidence, underestimate, moral and fail to see, which led to un-achievement of objectives.

Keywords: Decision making process, human errors, mental models, decision fail

1. INTRODUCTION

Undoubtedly decision-making is the most significant activity engaged in daily life, working environment, and all types of organizations at any level.

> A decision is defined as a moment, in an ongoing process of evaluating alternatives for meeting an objective, at which expectations about a particular course of actions impel the decision maker to select that course of action most likely to result in attaining the objective. (Harrison, 1998, p.5)

Human always face with decision making in all activities including organizations. According to McLaughlin (1995)

> Successful organizations 'out-decide' their competitors in at least three ways: the make better decision; they make decision faster; and they implement decisions more (page 443)

As far as the organizations are concerned, one of characteristics of manager's activity is taking decision (Harrison, 1998). In fact, Decisions are the core transactions of organizations. Therefore, the 'quick right' decisions are needed to achieve the companies goals. Paul C. Nutt (2002) who had been investigated 400 companies during 20 years concluded that half of decision made within business and organization failed. "…..*the true failure rate maybe higher because failed decisions that avoid a public aiming are apt to be covered up*" (Nutt, 2002).

Ofstad (1961) presented that decision is falling into a series of behavioral reactions in favor of something, a certain action where there is no doubt and a judgment that should have made after several alternatives. Simon (1960) and Niland (1968) stated that decision is about selection and commitment to get the best action from several premises.

Decision making is applicable for the organization activities, whether it is big or small organization, the needs of decision makers are essential. Then the decision making is become a generic process (Koontz 1969).

Decision makers during the process of decision-making may not pay enough attention to some important factors, whether it is obvious or hidden. Ignoring these factors could cause making a decision with unwanted consequences.

Different authors showed different processes in decision making. In general, they have similar point of view; problems, goals, alternatives, and finally, the action of choices. Simon (1960) stated three steps in decision making; finding occasions, finding possibility and choose of actions. Witte (1972) added information gathering in the first step of the decision making process to give a clear guide. The general process of decision making is also agreed by Schrenk (1969), Janis (1968), Eilon (1979), Fredrikson (1971) and Nutt (1989). Even though they continuously developed the former concepts to get the best one about decision making. According to Nutt (2002),

> The key cause of failure is the decision maker failure to see what they fail to see.

The factors that drive the decision makers could be external or internal factors. Human error is the main cause of decision failure. In fact, all decisions will be made by personal judgment even if some kinds of methods had been used to make the decision.

According to Peters (1966), Chapanis (1972) and Goldberg (1984), human error consists of any significant deviation from a previously established, required or expected standard of human performance. Senders and moray (1993) also considered "Human Error" as deviation from expected human performance. On the other hand, human being commit error

(Peterson, 1996), which is not because of they are wrong or dumb, but are caused by situations or conditions. These conditions will lead individual to err, which is faced with risks. Kletz (2001) has classified human errors into five categories:

1. Errors due to a slip or momentary lapse of attention
2. Errors due to poor training or instruction
3. Errors which occur because a task is beyond the physical or mental ability of the person asked to do it, perhaps beyond anyone's ability
4. Errors due to a deliberate decision not to follow instructions or accepted practice
5. Errors made by decision makers (managers) often due to a lack of appreciation of the part they should play

The error is made as an action resulted by human mental work. Mental models show more about how people see how the world works (Forrester, 1971). This is influenced by people biases, values, learning, experiences and beliefs (Ford and Sterman, 1998; Norman, 1983; Laird, 1983; Forrester, 1971).

There are two steps when human receive information, namely information gathering and processing (Flemming, 1985), these are:

I. Information Gathering
Information gathering is done by using ***Intuition***, which involves knowing without knowing how you know (Jung C.G, 1971). The intuition often cannot explain or discover how to gather data (Levesque, 2001). Intuition is usually called as instinct, something that can give direct understanding of a situation without any apparent rational thought or evidence (Adair, 2002). Intuition is needed according in gathering data which has to be improved, and then intuition can lead to much valuable information and guidance for decision making (Adair, 2002).

II. Information Processing
Information Processing contains two mental models elements. These are thinking and feeling.

Thinking is needed to perform our belief and to achieve the goal in the decision making (Baron, 2000). Here, thinking begins with doubts, then to eliminate or even remove these kinds of doubts; search is needed to reach the inference (Newell and Simon, 1972; Baron 2000). Thinking or thought is defined as a mental process, which allows modeling the world, and so to deal with it effectively according to their goal, plans, ends and desires (Baum, 2004; Shain, 1995).

Human feeling also can play a key role in the information processing. Feeling has emotion and moods as the elements. Emotion has partial part in decision; let's say that emotion is making decision without thinking. Thus, emotion makes effective decision and empowers relationships (Duxbury and Anderson, 2000). Nussbaum (2001) stated that emotions are essentially cognitive states of a subject. According to Baron (2000)

> A state that is subjectively experience as pleasant or unpleasant, that drives or motivates certain kind of behavior specifics to the emotion, and that tends to be elicited by a certain kind of situation (page 59)

Differ from emotion, the condition of ***moods*** will influence human feeling and can be traced to informative functions of feelings (Schwarz, 1990). Sad mood will draw on a systematic, data-driven, bottom-up strategy of information processing with extensive attention to detail. Happy mood will fall back on preexisting general knowledge structures, using a top-down, heuristics strategy of information processing with a smaller amount attention to detail (Davidson and Sternberg, 2003; Bless and Schwarz, 1999; Schwarz and Clore, 1996).

2. Mental Models and Decision Making Process

Generally, to make a decision is often difficult because of uncertainty and conflict within the process. (Shafir, Simonson and Tversky; 1993) The errors will be occurred in decision making, no matter whether they are avoidable or un-avoidable errors.

On the basis of Isenberg (1984) and Decision Making Process presented by Harrison (1998), Nutt (1989), Eilon, (1979), Witte (1972), Fredrikson (1971), Schrenk (1969), Janis (1968), Simon (1960) a mental model and decision making process can be presented as shown in figure 1.

The input of the process is information flow. This information is then processing in two ways, whether the mental models will filter it, or it could be changing the mental models (Isenberg, 1984). The received information then will be analyzed by decision makers using their mental models; in order to acquire several alternatives. Then these several alternatives are evaluated to achieve the goals. The result of this process is final conclusion, namely as decision.

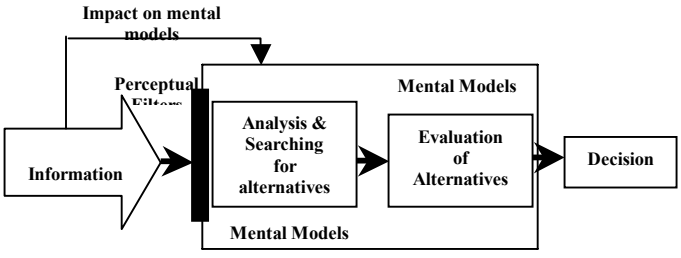

Figure1. Mental Models and Decision Making

Evaluation of the alternatives is the step before taking a decision. The decision makers will compare the alternatives based on certainties or uncertainties of cause-effect relationship and the preferences of the decision makers for various probabilistic outcomes (Harrison, 1998).

Basically, there are three modes that decision makers follow to evaluate the alternatives. These are judgment, bargaining and analysis. As shown in Figure 2, in Judgment Mode; the decision makers arrive at choice based on experience, values, perception and intuition (Harrison, 1998). While in Bargaining Mode; the decision maker is seeking alternatives that allow the attainment of objectives as part of compromise among concern parties in situation where external forces dominate or the choice promises to be controversy (Linblom, 1959). Differed with these two modes, in Analysis Mode; the decision maker evaluate the alternatives carefully and objectively while a choice is finally make to maximize utility (Mitzberg, Raisinghani and Theoret, 1959). In fact, these characteristics are different with different people. Therefore, a tool is needed to help the decision maker to decrease his/her dependency from subjective judgment and evaluation. This tool should be implemented by a team. To obtain this goal hazard identification procedure e.g. What-if, Hazop or FMEA could be an appropriate tool. In this case and due to team working, judgment will be more objective than subjective. In addition analysis could be more rationalized.

The main problem with the evaluation of alternative by decision maker is hazards, as the potential for error, exist with the judgment, the bargaining and the analysis. The main hazards exist with these modes during the evaluation and the recommendation to improve the process is given in Figure 2.

Modes	Hazards exist with different modes	Recommendation
Judgment	Human experiences Human values Human perceptions Human Intuition	Improve Mental Model
Bargaining	Compromise	Make it compatible between external forces and personal desires/interests
Analysis	Rationality Logic	

Figure 2. Modes and Hazards in evaluation of the alternatives

Considering Mental Modeling and Decision Making Process, in order to reach to a reasonable decision, the errors as hazard should be identified and eliminated. In doing so, some of the most important research questions are:

1. What could be the problems with collection relevant and sufficient information?
2. What could be the problems with perception?
3. What could be the problems with analysis of information and searching for alternatives?
4. What are the human errors as the potential of the decision failure in evaluation of alternatives?

This study is focused on research question 4. The main objective is to identify the human errors, in evaluation of alternatives, through analysis of some decision failures selected from the literature.

3. METHODOLOGY

To perform the study, deductive and inductive both are common way. An inductive approach generates a theoretical assumption from empirical discovers while a deductive approach verifies a theoretical assumption by testing the theory in reality (Yin, 1994). In this study, these two approaches are combined as recommended the best way for research by Dubbois and Gadde (2002).

The study started from literatures review, based on articles, books, and Internet sites. The aim was to grasp concepts of decision making, human error and mental models.

The research question and objectives were the point of start to do literature searching in order to extend keywords and search terms. The study was conducted in order to:

- *Get a systematic understanding and grasp of the basic theory of human errors in decision making*
- *Analysis of decision making process. Each step in decision making process was analyzed to get better understanding about the whole process.*
- *Two cases of decision failure were selected from the literature (Nutt, 2002) to see what have been the main causes of error in the decision makings. The selected cases were analyzed by means of Hazop study to identify the key criteria/uncertainties and also the possible deviations related to these criteria in evaluation of the alternatives.*

- *A framework (Figure 3) was developed to identify the causes including human errors leading the failure of the decision. Fish bon diagram was chosen for cause–effect analysis in this study.*

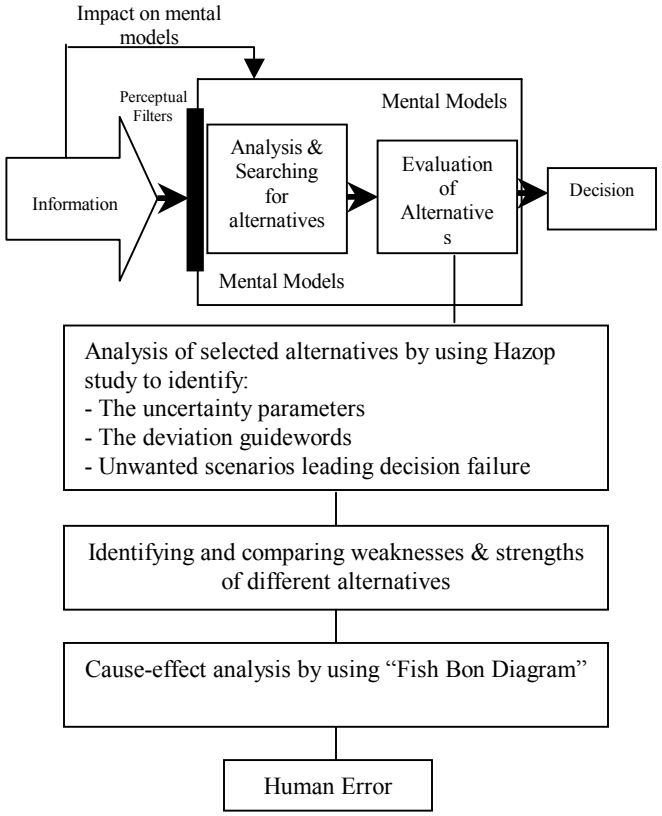

Figure 3. Framework of Study

Hazop Method was introduced to analyze the evaluation of alternatives based on modes. The use of Hazop analysis will be helpful in assessing effort to find possible solution that could be useful and never thought before. There were identification of the uncertainty parameters, the deviation guidewords and unwanted scenarios leading decision failure.

Based on hazop identification, the weaknesses and strengths were compared. And then cause-effect analysis was done by means of fish bone diagram. As a final point, human error was resulted.

4. CASE STUDIES

Two cases, EuroDisney and Shell Brent Spar, were selected from the literatures for the analysis.

A. EuroDisney

The Disney Empire is one of the icons that are valuable in the market. The idea of theme park came up in 50s. The gigantic success gained by two Disney Parks in California – established 1955 and Orlando – established 1971 led Michael Eisner to build the first overseas park in Tokyo, Japan, 1983. In Tokyo, a great success achieved that meant the theme park could be readily exported. The enthusiasm of European, especially Britannia to come to US to visit Disney Park also one of the reason to build the theme park in Europe, and it would be a way to achieve another great successful story about Disney Empire.

To realize this plan, two hundred possible locations within Europe has been analyzed, but then deducted to two alternative options, Spain (Barcelona) and France (Paris). The approaches did by French Government attract Michael Eisner. The cheap and abundant land, economical loans, links of good transportation; road and rail, to the park and the tax breaks as well were the interesting points were offered by the French Government motivated Eisner to choose Paris as the location of new theme park. This new theme park "EuroDisney was opening on April 1992. Eisner expected to get the same success with Tokyo Disneyland. Disney consultant firm, Arthur D. Little projected the visitor's attendance would be in range of 11.7 millions to 17.8 millions in the first year. But, the big expectation went wrong. The first year, Disney lost $960 millions with rate of lost $ 1 million per month. In 1994, Disney lost $400 millions.

- Analysis of the decision

  The decision that has been taken by EuroDisney decision makers after evaluation and comparison of two alternatives was Paris, France. This decision is taken even though there were some weakness points.

  In order to evaluate the decision taken in site selection, Hazop study was applied. Five criteria/uncertainty factors were identified. These are:

  - Market
  - Weather
  - Government concession
  - Accessibility
  - Culture

Success of the project in terms of profitability (S) is

defined as:

S=f(Customer satisfaction(Cs), Market(M), Government concession(Gc))

And,

Customer satisfaction=f(Culture©, Weather(W), Accessibility(A)) ,

Therefore,

$$S = mC + nW + oA + pM + qGc$$

Where m, n, o, p, q are the weight factors.

Culture and weather play a very important role in customer satisfaction and accessibility could have a high score when being supported by culture and weather.

Government concession could effect on project profitability. But, it cannot guarantee the attendances, especially when the culture and the weather are not in the favor of the customers. On the side, government concession could not stay as a stable factor. It may change by changing of the government policies or the rules.

On the basis of Hazop study five important unwanted scenarios leading to decision failure/economic loss of the project have been found. Theses are:

a. Less/no attendance due to competitor in similar branch
b. Less/no attendance due to improper weather
c. Less/no attendance due to customer un-satisfaction caused by the dominated culture
d. Less/no attendance difficulties to reach the park e.g., because of jam traffic.
e. Inability to keep the government concession on due to changing the policies and the rules

Considering the criteria and the unwanted scenarios, it could be found that Paris was not the best choice. The points of strength and weakness of each site is given in Figure 4.

EuroDisney decision makers put their subjective consideration in their judgment with economical issues, in terms of Government Concession, as their priority more than others. In fact, the French Government offered very good concession compared to Spanish Government. This priority made EuroDisney decision makers ignored impacts of the weaknesses.

Locations	Strength	Weakness
Barcelona, Spain	Weather Superiority Potential Customers Spanish Cultures	Accessibility Government Concession
Paris, France	Accessibility Government Concession	Weather Superiority Potential Customers French Cultures

Figure 4.: Strengths and the weaknesses of the alternatives

In fact, these weakness points led to blunders, which forces Disney decision makers to take some remedial decision that also led to fail. For example, after decision is taken, decision makers tried to solve weather problem by indoor building design. This design later became bottleneck for the EuroDisney to attract more customers, which resulted in much less attendance than the projection has been made by Arthur D. Little. Not only for the weather points, had the ignorance about culture differences also led to blunders. For instance, Disney did not allow alcohol within the park as well as the picnic. This showed how Disney did not consider about European culture to drink alcohol and bring the food to the park. In addition, some problems came from EuroDisney local employee that unwilling to speak English and wear Disney dress code.

Undoubtedly, the ignorance and neglect of the weakness points in decision making process made possible negative outcome. The judgment of EuroDisney based on Eisner's feeling that influenced by Disney theme park successful experiences, big expectation to get the same success and over confidence for the new Disney Theme Park in Europe.

B. SHELL BRENT SPAR

The Brent Star was taken out of operation in 1991 after about 15 years service in the Shell/Esso Brent Field in the northern North Sea – The UK's biggest source of oil and gas. A very large floating oil storage and loading buoy, the Spar had stored from the Brent "A" platform and acted as a tanker loading facility for the whole of the Brent Field.

It was unlike almost any other installation in the North Sea. Like an iceberg, most of its bulk - mainly six huge storage tanks - lay beneath the water's surface. At 14 500 tonnes, the Spar weighed about the same as two thousand double-decker buses. It was longer than a football field floating on its end, and its huge tanks displaced 66 500 tonnes of water - a capacity that meant they could hold the equivalent of almost four Big Bens. Its size had serious implications for moving it around - apart from the waters to the North of Orkney, most of the North Sea was too shallow to accommodate it.

While the Spar was fit for the purpose for which it was designed, calculations of its structural strength under various stresses showed that the original installation process could

not simply be reversed. Raising it up out of the water in its vertical floating position, or attempting to rotate it to the horizontal, both posed a significant risk to its structural integrity. This was mainly due to its intrinsic design, and the need to maintain, during movements of this kind, the balance of internal and external pressures to stop the tanks' walls from buckling and imploding. This challenge was further complicated by the fact that two of the Spar's six storage tanks were damaged during operation

Shell UK's original thoughts were to return the Spar to shore for disposal, but the more this was studied, the more difficulties were uncovered. The challenge had never primarily been one of dealing with waste or the actual process of scrapping, both of which would have been manageable once the Spar reached the shore. Here lay the fundamental challenge - getting the Spar out of the water or even just raising it higher without posing undue risk to people or the environment, would require an exceptional feat of civil engineering.

Based on the unique characteristics of the Spar and its surrounding waters, Shell UK proposed two choices at the first hand which are listed below:

Deep Sea Disposal (DSD)

1. Tow the Brent Spar to the North Atlantic.
2. Use the explosives to sink the platform.
3. Allow the structure to settle on the sea bed.
4. Technically the easiest option

On-shore dismantling

1. Tow the Brent Spar into a deep harbor.
2. Decontaminate the structure and reuse the materials.
3. Dispose of the waste on land.
4. Technically more complex and with a greater hazard to the workforce.

Among these options, horizontal dismantling and deep water disposal were considered in detail to determine the Best Practicable Environmental Option (BPEO) for disposal. Shell reasons for choosing the deep sea disposal are given in Figure 5.

Engineering complexity	Sinking the Brent Spar is more straightforward than the on-shore dismantling option.
Safety of the workforce	The deep sea disposal posed fewer hazard to the workforce than the dismantling option.
Environmental impact	Sinking would only have a localized impact in a remote deep sea region
Acceptability	Deep sea disposal had the approval of the UK government and regional authorities.
Cost	Sinking the Brent Spar is the cheapest option.

Figure 5. Reasons of Choosing DSD

Although, the selected option was approved by UK Government and regional authorities, the project never started. Because Greenpeace reacted fiercely, claiming that the project will impact on environment. This reaction was supported strongly by the society. Shell realized that the power of angry society and its economic consequences had been underestimated during alternative selection. Shell was forced to find an optimum solution to get rid of the crises.

The final decision was using the Spars' hull to build a quay extension at Mekjarvik near Stavanger in Norway. The project was approved by UK Government. The project was effectively completed in July 1999 when cut and cleaned ring sections of the buoy's hull were placed on the sea bed at Mekjarvik, to form a base of a new quay. The consequences of the decision failure were about four years delay, expending £60 millions instead of £21.5 millions as the original estimation for dismantling project, and loosing of millions of Dollars due to the society reflections in UK and the other parts of the region.

- Analysis of the decision

  In order to identify the scenarios leading failure of decision made by Shell, a Hazop study was carried out. The most important uncertainty factors found in this study were:

  a. Technical operation complexity
  b. Structure integrity
  c. Social and independent environmental institutions attitudes
  d. Project operation time

  In our study two main scenarios have been identified as:

  1. Loss of human life due to: Accident caused by technical operation complexity; poor analysis, planning and control in operation; structural problem during operation.
  2. Economy losses due to: Accidents due to complexity and poor control of operation, extra time, resources, and energy needed as a result of operation complexity, delay in operation or changing an alternative to another one as a result of:
  3. Poor analysis of environmental impacts,
  4. Poor communication with / or neglecting social and independent environmental institutions.

  Comparing these alternatives, Deep Sea Disposal (DSD) has more advantages than Onshore Dismantling (OSD). The weaknesses of On-shore Dismantling option are:

  a. Higher complexity of operation due to the demand

in:

- more work
- longer operating time
- more man-power
- heavier machines to operate vertically

b. Higher probability for occurring accidents and human losses due to higher complexity of the operation
c. Higher probability of structural failure due to rotating, vertical and horizontal movements
d. Higher environmental problems due to higher probability of structural failure and operating on coastal area
e. Higher cost of operation due more human resources, more time consuming, more capital, and more energy needed
f. Higher cost of responses to environmental accidents due to possible impacts on coastal area

Considering these weaknesses it could be found that the decision taken by shell in selecting the Deep Sea Disposal was a correct one. However, this decision has weakness in environmental impact evaluation that later became a critical point for some negative consequences. In fact, even though the environmental impacts had been confirmed by some experts but it is not enough to make this decision acceptable for all parties. Shell fully believed this solution was the best solution to carry out the Brent Spar disposal, but they paid no attention to the public's reaction. The consideration only taken from the company's point of view that is Deep Sea Disposal has minimum impact to the environment. The judgment had been made, actually, influenced by self-awareness and perception that this will be accepted naturally by all parties.

C. Human Errors Analysis

Analysis of alternative evaluation in the process of decision making in the selected cases showed that negative consequences resulted by decision failure achieved due to human errors. There are errors made by human in decision making process that were caused negative consequences as the results. The analyzing of human errors in these two case studies has used visual mind. Mental models that have been used in these two case studies are thinking and feeling, which are falling into evaluation of alternatives step. The thinking and feeling in this step manifested to human errors, which are here identified.

On the basis of cause-effect analysis, using Fish Bon Diagram, possible causes of error have been identified.

Human errors in this step could be categorized in five based on analyses of evaluation of alternatives, decision analysis and the consequences.

- ***Ignorance or Neglect***

Roughly said, ignorance is omission to obtain knowledge which one may acquire and it is duty to have. Decision makers often ignore or neglect some factors, whether they are obvious or hidden. This could be because of human experience, human values, human perception or human intuition. In EuroDisney case, Disney's experiences in preceding success of Orlando, US, and also in its first overseas theme park in Tokyo, Japan, make EuroDisney decision makers truly believe there are no big barriers will be faced. Big expectation to have the same success is the main goal which made the EuroDisney decision makers ignored some weakness in their decision analysis which actually was critical points in their achievement of the objectives. For instance, the ignorance in weather condition and culture differences even though they had been analyzed these points as the weakness of location in Paris which later became the main causes of the blunders in EuroDisney.

On the other hand, Shell Brent Spar case has different part where the decision makers ignored some points. The Shell decision makers ignored the public feeling which they should have to pay more attention because their decision about Deep Sea Disposal would impact not only for Shell but also for the community. The ignorance about public feeling later was followed by Green Peace campaign and public protest as the negative consequences of the Deep Sea Disposal decision.

- ***Over Confidence***

Over confidence is feeling of exaggerated trust in someone or something, which is in decision making process, especially in evaluation of alternatives, will lead to decision fail as well. In EuroDisney case, the decision makers felt overconfident to gain the same success or even spectacular success because of their previous success in Orlando and Tokyo. These successes made the decision makers trust with their capabilities to establish the next overseas theme park in Europe. The high projection had been made to achieve their goal as well as management hubris.

In another case of Shell Brent Spar, decision makers fully believe with their estimation in environmental impacts of Deep Sea Disposal because of long time and money to do analysis and evaluation. The confirmation from some experts in this field also contributes to their trust for their own assessment.

But later both of the decision makers who felt truly

believe with their judgment because of overconfidence had to face with their failures in decision.

- ***Underestimate***

  The less estimation of true or actual value can be defined as underestimate, which often take part in decision making process. Underestimate of some factors that actually should be taking more attention by decision makers will bring about negative consequences. It can be seen in EuroDisney case, which the EuroDisney decision makers underestimated in tickets prices at the beginning of the EuroDisney projection and then when it put into practice it faced with some problems, such as less attendance. The same problem also faced in Shell Brent Spar, where the decision makers underestimate the impacts in environment even though they spent time and money to do analysis. Definitely, this error initiated to decision fail.

- ***Fail to see***

  Decision makers need to consider about hidden factors in decision making process. The inconsideration about hidden factors make decision makers fail to see some elements that should be take into account before making decision. In fact, decision makers often realize about this when the negative outcomes faced. This condition can be seen in EuroDisney case, where the decision makers never thought about another US theme park can be their competitor. This is due to the fact that people prefer to flight to Orlando that is cheaper with good weather condition. In addition, the economic recessions also blew up and never being thought by EuroDisney decision makers.

  As well as EuroDisney case, the Shell decision makers also had some unexpected problems as a result of indirect impact of Deep Sea Disposal. This is illustrating how the decision makers did not have back up plan that they should predict before they came up with Deep Sea Disposal. Obviously, the inconsideration about possibly factors or hidden factor will end in negative consequences as the result of decision fail.

- ***Moral***

  People have different principle about right or wrong. The differences in moral thought in decision making process need more attention. It is not only from one decision makers' perspective but also needs to think about other perspectives outside of the organization when the decision is made. When EuroDisney decision makers thought about their ethics of not allowing alcohol and picnic based on Disney principles, they forgot to contemplate the European thought about alcohol. The same dilemma also occurred in Shell Brent Spar, where the Shell decision makers kept confidential some problems of Deep Sea Disposal because of they thought company's secret. This is totally different with public opinion, which needed transparency. Thus, the principles in thought about right or wrong in decision making process can create the blunders when the implementation of decision is taken.

In conclusion, two case studies, EuroDisney and Shell Brent Spar illustrated contribution human error in decision fail obviously. In both cases, decision makers with all of their abilities and capabilities still could not generate the good decision because of the errors occurred from the beginning and just realized in implementation process. Definitely, the EuroDisney and Shell decision makers could not achieve their final goal that they had been stated from beginning or even though they can achieve it but after a lot of remedies in their decision.

5. CONCLUSION

Human errors play an indispensable role in the decision fail both in the case of Euro Disney and Shell Brent Spar. Five errors in the mental model of decision makers were spotted in the step of alternative evaluation in the decision making process. These five errors all resulted in the unachievement of original objectives, either directly or indirectly. Ignorance or neglect some problems in decision making process, certainly initiate in decision fail with negative outcomes as the final consequences. The ignorance is related with overconfidence where the decision makers has high trust feeling about something that is supported by their experiences or knowledge, values, perception and etc, which on the other hand, make the decision makers underestimate for a small stuff or even fail to see some hidden factors. The judgment influenced by these mental factors and makes it possible to have blunders. Besides these errors, human thought about right or wrong also needs to take into account, because of the differences for every person thought about this.

The combination of these errors arise because of a lot of things that come from human mental which is influenced their thinking and feeling. It is not simply to avoid this kind of errors, but also it is not impossible to minimize them. Understanding about human error in decision making process which is related with mental models parts will make decision makers carefully within their process and will be readiness for any kind of negative outcomes or even unexpected outcomes. Finally, the understanding is not enough without improvements in decision makers' mental model, because it is needed to minimize those kinds of errors.

6. RECOMMENDATION

Since the human errors identified come from the mental model of human beings, it is difficult to avoid them. However, it is quite possible to minimize negative impacts from them through improving mental models of decision makers. It needs further studies in term of human error from mental models perspectives that is combining in decision making process, because of their contribution in decision fail.

In this case, further studies can be undertaken to identify the methods that could be possible to use to improve human mental models.

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