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# Risk Management Psychology and Practice

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Submitted to the Program of Organizational Dynamics in the Graduate Division of the School of Arts and Sciences in Partial Fulfillment of the Requirements for the Degree of Master of Science in Organizational Dynamics at the University of Pennsylvania

Advisor: Keith Hornbacher

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## **Abstract**

This thesis examines the theory of human behavior towards risk and uncertainty in addition to the psychological effects they have on the managerial decision-making process. Analysis indicates that risk often produces a negative reaction in individuals, which ultimately ends in avoidance. I describe how our responses to risk are often influenced by heuristic biases, psychometric paradigms, and emotional literacy. These influences form the attitudes that become mental hurdles to approaching risk objectively and proactively. The collective attitudes within organizations contribute to the overall risk culture. This thesis identifies competencies required to establish a mature risk culture which is the critical foundation for implementing risk management best practices. Once the foundation is in place, there are formal methodologies to proactively identify areas of uncertainty and provide qualitative and quantitative assessments. The objective is to provide managers the proper tools to develop sound responses to risk based upon objective analysis of facts in lieu of distorted biases. A proactive approach in seeking out risk instills the confidence in managers to manage risk effectively.

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RISK MANAGEMENT PSYCHOLOGY AND PRACTICE

by

Mark D. Barnabei

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Graduate Division of the School of Arts and Sciences in  
Partial Fulfillment of the Requirements for the Degree of  
Master of Science in Organizational Dynamics at the  
University of Pennsylvania

Philadelphia, Pennsylvania

2008

RISK MANAGEMENT PSYCHOLOGY AND PRACTICE

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## ABSTRACT

This thesis examines the theory of human behavior towards risk and uncertainty in addition to the psychological effects they have on the managerial decision-making process. Analysis indicates that risk often produces a negative reaction in individuals, which ultimately ends in avoidance. I describe how our responses to risk are often influenced by heuristic biases, psychometric paradigms, and emotional literacy. These influences form the attitudes that become mental hurdles to approaching risk objectively and proactively. The collective attitudes within organizations contribute to the overall risk culture. This thesis identifies competencies required to establish a mature risk culture which is the critical foundation for implementing risk management best practices. Once the foundation is in place, there are formal methodologies to proactively identify areas of uncertainty and provide qualitative and quantitative assessments. The objective is to provide managers the proper tools to develop sound responses to risk based upon objective analysis of facts in lieu of distorted biases. A proactive approach in seeking out risk instills the confidence in managers to manage risk effectively.

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## CHAPTER 1

### INTRODUCTION

#### Background

Regardless of our background or position, everyone encounters uncertainty. How we deal with uncertainty is the basis for this thesis. Novelist Raymond Fiest wrote, “To be alive is to be at risk.” meaning we all face risk no matter what we do. Risk is the consequence of uncertainty that can be quantified by impact and probability which typically draws a negative response in managers. Human behavior towards risk is most often to shy away from the subject due to the uncomfortable feeling one gets when thinking about what one doesn’t know or the probable outcome based on uncertainties. The subject leaves managers feeling hopeless and not in control.

I am intrigued by the psychological effects of risk because I have observed many conservative organizations that typically avoid the subject or view risk in a different context. What I find even more interesting is the lack of attention the subject receives in today’s corporate environments. The reactions I have observed from managers throughout my career is to rely heavily on consultants at the sign of uncertainty, which is has become a familiar psychological reaction. They immediately attempt to transfer risk even if internal consulting expertise exists in their area of uncertainty. A perfect example of this phenomenon was the Y2K crisis in 1999 - 2000. Chase Manhattan bank reported Y2K expenditures of \$363 million on consulting services and mitigation plans in response to what some experts felt was not as significant as what many corporations anticipated.

The consulting revenues gained during the Y2K crisis were astronomical because of the fear generated by the news media based on inferences of some technical experts. What intrigues me even further is how one person's fear (uncertainty) becomes another person's treasure. Consultants thrive on uncertainty because businesses are willing to pay extraordinary fees for "expertise" in the businesses specific areas on uncertainty.

I begin the thesis by introducing those human behaviors towards risk that become mental hurdles to approaching risk objectively and proactively. The first concept that is introduced is what Michael Apter calls "protective frames," which refers to one mental state related to danger or safety at any given moment (Apter, 1992). Apter describes this state as risk seeking and risk avoidance and these states are determined by the person's particular "protective frame." The next concept presented is the psychometric paradigm, which can be described as mental model or pattern that a person has based on past experiences (Breakwell, 2007). These paradigms influence our own behaviors towards risk based on widely accepted viewpoints that have been engrained in our minds through sensationalism, popularity or widely accepted opinions. The last human behavior concept covered is heuristic biases (Tversky & Kahneman, 1974). The term heuristic bias is defined as a prejudice that is developed over periods of time that are self-learned and reinforced by experiencing certain concepts over and over. These biases can distort the reality of certain risks from our perception based on these biases.

It is my intent to depict how these human behaviors towards risk eventually influence our attitudes which collectively make up the risk cultures within organizations. These cultures determine each organization's risk maturity level and the maturity level determines the organization's openness to proactively managing risk with an objective

approach (Hillson, 2004). I finish the thesis with an overview of Hillson's qualitative and quantitative methodology for managing risk and opportunity effectively. I include a case study of an organization that initiated Hillson's methodology without having the proper maturity level and the struggles they had accepting the concept.

The purpose of this thesis is to call attention to the specific psychological hurdles project managers experience when confronting risk and offer guidance through a methodology that will encourage a proactive approach in dealing with probability and impact. Once managers are conscious of their behaviors and what drives them, they will be more receptive to techniques that will allow managers to perform their own risk analysis and eliminate that helpless attitude. I use David Hillson's book titled "Effective Opportunity Managing for Projects" and PMI's "A Guide to the Project Management Body of Knowledge" as excellent references to methods of responding to risk that can empower managers to gain more control over risk (Project Management Institute, 2003).

It is important to understand that the studies of human behavior towards risk and uncertainty are numerous and require the competencies of those who possess the necessary training and experience to practice in the field of Psychological Analysis. It is not my intent to prescribe psychological intervention as a means of addressing the theories discussed in this thesis. My approach to this subject is from the perspective of a Project Management professional faced with the uncertainties inherent to managing risk. The objective of this thesis is to call to mind those psychological barriers that interfere with our ability to make practical decisions regarding risk. I do not possess the educational credentials to offer formal psychological remedy. However, it is my goal to

present those best practice methodologies to dampen the effect of the psychological conditioning from these barriers.

David Hillson and Ruth Murray-Webster, (Hillson, 2004) offer an objective approach that alleviate the conditioned dependency on heuristic biases and paradigms that dominate our responses towards risk. The authors offer “emotional literacy” as a powerful means of generating the required change to encourage the ability to handle uncertainty positively. Awareness is the first step towards this change. However, change management and the psychological resistance to change is an entirely separate subject that goes beyond the scope of this thesis. There is no quick fix to improving attitudes towards risk. The first step in the journey is self-awareness of the theories that impair our risk objectivity.

## CHAPTER 2

### HUMAN BEHAVIORS TOWARDS RISK

#### Protective Frames: Confidence, Safety & Detachment

In this chapter I leverage Michael Apter's (1992) book, "The Dangerous Edge" to support my premise of how human behaviors towards risk could affect the managerial approach towards controlling risk. In this section I also discuss those states of mind that occur based on the presence of risk, uncertainty or perceived danger. Included in this discussion, are the physical reactions that occur while under extreme risk. The underpinning idea is exposure to extreme risk, especially for prolonged periods, has a physical and mental effect which could ultimately influence our decisions as managers. We need to recognize these factors when building our project organizations and assigning resources to manage high risk projects.

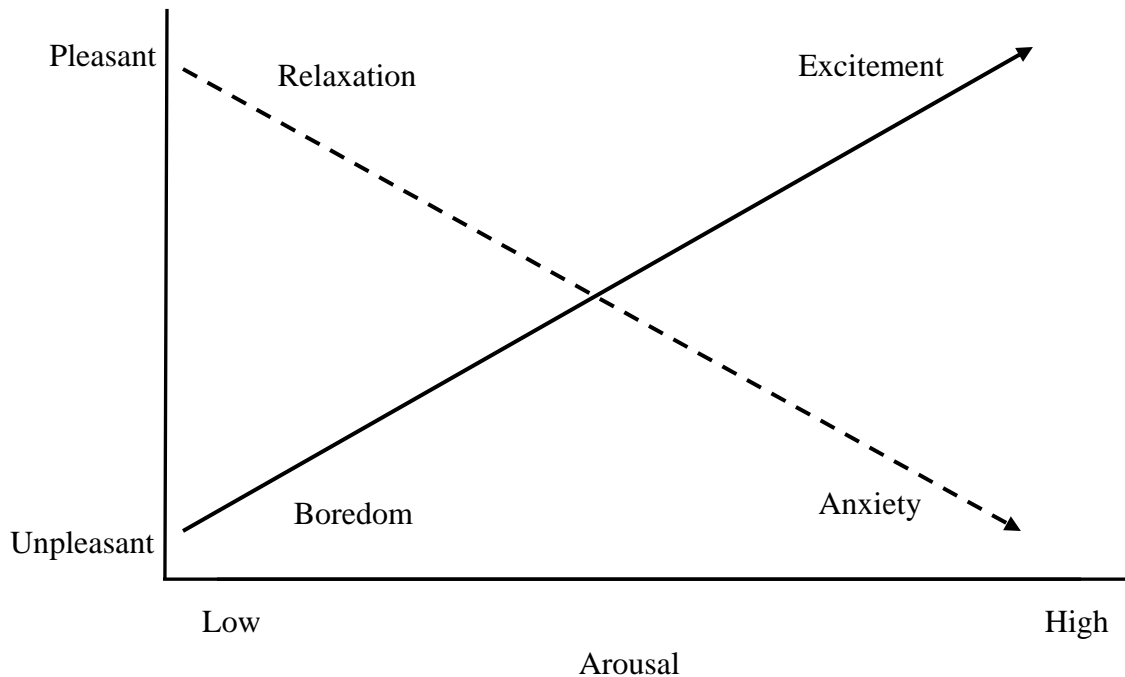
To better understand the concept of protective frames it is imperative to understand the physiological affects risk has on humans. According to Apter (1992), there are two fundamentally different ways of experiencing the uncertainties of life and the world. The reason for this is that people view risk from two different perspectives. These perspectives are based on the "protective frame" present while experiencing risk. The first possible experience is excitement because risk presents a certain thrill to some who seek the experience. The other experience is anxiety to those who are looking for predictability in their lives. The odd thing about both perspectives is that they produce the same physiological effect on the human body.

Excitement and anxiety are two different states of mind that produce the same affect on humans. Physiologists use the term arousal to describe the reaction in the body

to excitement and anxiety. Arousal produces a number of bodily reactions that stem from the autonomic nervous system which controls the body's housekeeping (Apter, 1992). It is the body's mechanism preparing us for a reaction to the potential danger. When aroused the body responds with a pounding heart, deep breathing, dry mouth, an uneasy feeling in the stomach and perspiration. Even though excitement and anxiety produce the same physiological response, they obviously differ because excitement is pleasant and anxiety is unpleasant. Regardless of the emotion, the human body cannot sustain the physiological affect for a prolonged period without causing irreparable harm. Simply stated, we humans cannot physically be in an aroused state all the time. Michael Apter uses the following graphic to depict the relationship of arousal intensity and level of pleasure that occurs during the range of boredom to excitement and relaxation to anxiety (see Figure 1).



Figure 1. Excitement-Seeking – Anxiety-Avoidance diagram (Apter, 1992)

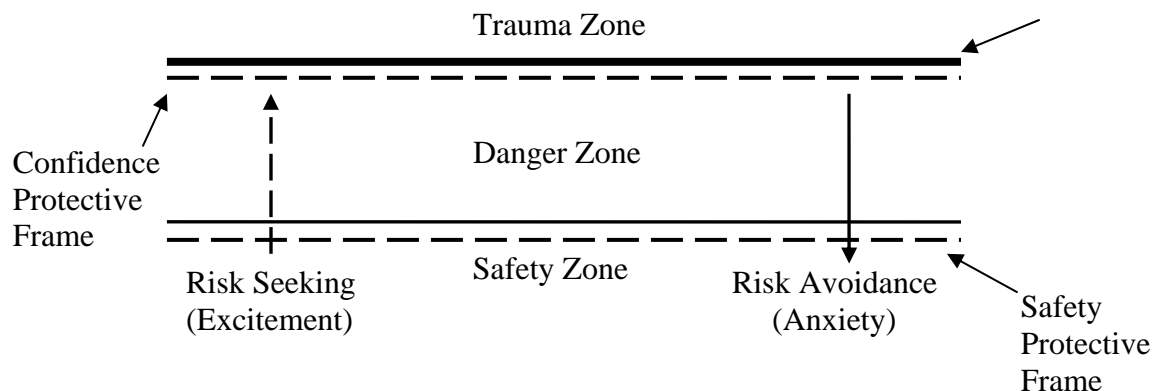


These two contrasting states of mind make up our everyday experiences as we encounter events and people in various situations. Based on our mindset at any given point, we will react differently towards our approach to risk, which could result in switching back and forth between each state.

Depending on our current perception regarding our possible two emotions related to risk, our reaction will be different as we approach the dangerous edge (Apter, 1992). This is how Apter describes the boundary between risk (danger) and trauma, where we move from a protective frame of lower risk to a state of trauma where risk is at its highest level or potential for harm or euphoria, depending on the state of mind. The two possible emotions we encounter in these zones are Risk (Excitement) Seeking or Risk (Anxiety)

Avoidance. According to Apter, there are three zones in his model for protective frames. These zones are safety, danger and trauma (1992). The closer you move from the safety zone to the dangerous zone and then trauma zone, your risk is increasing due the greater likelihood (probability) of trauma. These zones are what Apter refers to as “personal ways of demarcating one’s life-space and of evaluating the events occurring within it...” (Apter, 1992) Below is an illustration used by Apter to display the relationship between zones in the protective frame and the two emotions of excitement and anxiety previously mentioned (see Figure 2).

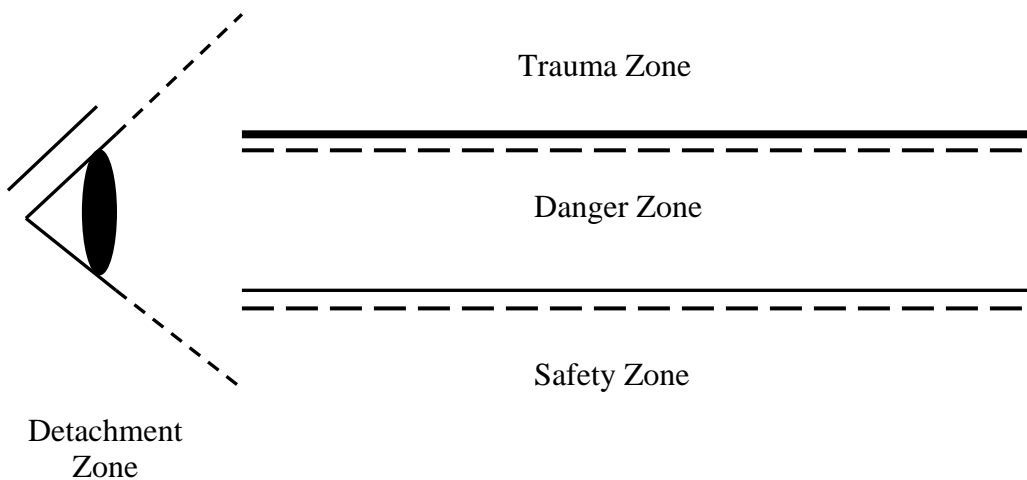
Figure 2. Protective Frames: Trauma, Danger and Safety Zones diagram (Apter, 1992:50)



The psychological shelter in the Confidence Protective Frame is from the assurance that the excitement-seeking person has regarding the concept of getting as close as possible to trauma without being traumatized. In the anxiety-avoidance state there is no protective frame preventing anyone from being traumatized because individuals in this state are only comfortable when they are within the safety protective frame. The safety protective frame not only protects against trauma but also protects against the feeling of danger.

Being in the safety zone protective frame individuals are in the anxiety – avoidance state. The most commonly recognized safety zone is the home because it produces a feeling of security from the outside world. The third and final protective frame that Apter describes is the detachment protective frame. This frame is in a dimension that is totally removed from the trauma, danger and safety zones because it is from a viewpoint that is independent of this environment, which is similar to a spectator at a sporting event. The spectator is under no personal threat, which means there is no reason for feeling safe or in danger. Figure 3 presents Apter’s diagram which depicts the detachment frame being independent of the three zones.

Figure 3. Detachment Zone diagram (Apter, 1992: 61)



Of the three protective frames mentioned in this chapter, the detachment frame is probably the best frame for evaluating risk due to the subjectivity related to being in the three zones. In the detachment zone your response to risk is more objective because you

are not overly influenced by the emotions encountered in the other zones. The detachment frame allows you to approach the evaluation of danger or risk from an objective point of view based on quantitative methodologies that will be discussed further in later in Chapter 5.

### Reversal Theory

According to Apter, if any of the three protective frames discussed earlier is in place, then individuals will be looking to increase their feeling of arousal. If none were in place, they would be looking to lower their feeling of arousal. Based on this theory, as individuals go through their everyday lives, they will rotate back and forth due to their current protective frame, described in the previous section and the risk situation they encounter at the present moment. This is what Apter refers to as the Reversal Theory (Apter, 1992:196). The author has written other books specifically related to the concept of Reversal Theory. The theory refers to the amount of time individuals will spend being in one state versus the other and how often they reverse feelings. It seems the older we become, the more we tend to remain in one state for extended periods of time. There have also been studies that found correlation between the frequencies of reversal and individual personalities. Apter believes that the balance between arousal-seeking and arousal-avoidance is based upon our past learned experiences.

The obvious question surrounding all this theory is the relevance of protective zones, arousal, excitement, anxiety and reversal to our personal approach to evaluating risk. The inference I am making is that all of these factors weigh heavily on the decisions being made in our professional and corporate lives. It has been my personal experience

that most responses to uncertainty are influenced more by these psychological factors, because that is what most professionals have to rely upon. Our mental state can have greater influence over ability to think rationally and could cause us to hide from the danger of uncertainty. It is my opinion that, as professionals, we need to override the bias our mental state has over our approach to risk and to rely on a balance that includes the objectivity of quantitative methodologies for the assessment, response and management of risk.

Apter indicates that we have no control over our biological bias in either direction of risk seeking or risk avoidance for our bias is based on what we learned and past experiences in our lives. However, he does state, “we can change our *effective* dominance to some degree by overriding these internal biases,” thus limiting the intervening control the protective frames have on our attitudes towards risk (Apter, 1992). The fullest life is led by those individuals who experience both states on a regular basis. By switching between them at appropriate times, we enable ourselves to face up to things which are genuinely threatening or important (Apter, 1992). I can relate to what Apter is stating because there have been times in my own life when too much anxiety-avoidance has led to missed opportunities and where too much excitement-seeking has led to unfortunate consequences.

### Psychometric Paradigms

Up to this point, I have described individual attitudes towards risk. The remaining part of this chapter is focused on the perceptions of observers. The relevance of these public perceptions is due to the influence they have on our personal attitude

towards risk. When we encounter risk in areas of unfamiliarity, we tend to follow popular viewpoints which could be distorted. Public perception towards potential hazards and the risk associated with them heavily influences government policy on Federal and State levels. Government decisions on where to apply limited resource in mitigating certain risk related to hazards is based on what author Glynis Breakwell (2007) labels psychometric paradigms. A paradigm can be defined as a philosophical or theoretical framework of some discipline based on generalizations. In layman's terms it is a popular belief or viewpoint based on general opinion formed by past experience. Psychometrics is a series of measurement procedures and models of statistical estimation. Paul Slovic, one of the originators of psychometrics, states that, "risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional and cultural factors." (Lichtenstein, Slovic, Derby, & Keeney, 1983)

According to Breakwell, the general perception (paradigm) of hazards and risk are mainly based on the risk characteristics rather than true statistical data on probability and impact. The popular general opinions on the severity of the risk are based on voluntariness, knowledge, and dread. Voluntariness is the amount of control individuals have to get out of the risk. Knowledge, in this context, is the amount of familiarization about the risk. Dread is the risk that people have learned to live with and think about calmly. These are some of the general characteristics and statistics that have been analyzed as part of the works of Paul Slovic, Sara Lichtenstein and Baruch Fischhoff (Fischhoff, Lichtenstein, Slovic, Derby, & Keeney, 1983). In addition to these works are the similar studies conducted by the government on public perceptions of hazards and risk. (Breakwell, 2007) As stated previously, these same studies are used to determine

funding allocation for future responses. Government officials use this information to ascertain those hazards that are foremost in the minds of the country's population.

A good example of a perceived potential hazard with high risk that was extremely high on statistical perceptions was the Y2K crisis at the turn of the Millennium. Due to the amount of media attention this crisis received, many endured a significant amount of "dread" and "involuntariness." The public was under a state of high anxiety in anticipation of the changing to the year 2000 due to the professed Information Technological impacts. So much attention was drawn to this calamity that governments and industries spent billions of dollars on prevention. What happened turned out to be the biggest non-event of the Millennium. Commercial aviation has other hazard and risk perception paradigms that are high on the psychometric studies. The general public has a high degree of dread regarding commercial airlines and their potential hazards. The Federal Aviation Administration spends enormous funds each year regulating the commercial aviation industry while the perception of the general public still persists. In spite of the enormous expenditures regulating air travel in congested airspace and bad weather, the general public still perceives air travel as the most unsafe form of transportation. Actual statistics disprove this perception.

What is important to understand is the reason why the general population has these paradigms surrounding certain perceived hazards and risks. There has been significant research into the reasoning behind human behaviors towards likelihoods of risks and their impacts. Two men who have been in the forefront of the field in this research are Amos Tversky and Daniel Kahneman. Their most related research was founded on the perception biases in judgment based on heuristics of thinking under

uncertainty. Tversky and Kahneman categorized their findings under three distinct areas known as representativeness, availability, and adjustment and anchoring (Tversky & Kahneman, 1974).

Representativeness addresses the questions concerning the probability of “A” belonging to class “B” or the probability that event “A” originates from process “B” (Tversky & Kahneman, 1974). People tend to rely on the degree of representativeness heuristic that “A” is representative of “B.” A good example of this was an experiment based on representative characteristics of a librarian. In the authors’ experiment, a person is characterized as being very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail. Of a list of possible occupations such as farmer, salesman, airline pilot, librarian or physician, how would you order these as being most likely based on the description above? The result of the experiment is that the overwhelming majority of respondents list the librarian occupation as the most likely. The reasoning as to why the respondents chose the librarian occupation is what Tversky et al. refer to as insensitive to prior probability. If the respondents had known that the ratio of farmers to librarians is approximately 1000 to 1, they would not have responded the same way. Prior probability indicates that the reasonable primary occupation is farmer over librarian. This approach to assessment of probability leads to serious errors because “similarity” or “representativeness” does not address the true factors that should influence judgment. The unjustified confidence that the description of this person matched the occupation of librarian or any predicted outcome is also known as the “illusion of validity”.



Tversky and Kahneman's second category of heuristic bias is what is known as availability (Tversky & Kahneman, 1974). This category deals with the assessment people make on frequency of class or the probability of an event based on familiarity or popularity of the subject. The most prevalent example of this is what Tversky et al. refer to as biases due to retrievability of instances. A paradigm for this is when the size of a class is inferred based on easily retrievable instances that make the class seem larger. An example of this bias is when a team of respondents was asked to determine if two lists contained more names of men than women. The first list presented included famous well-known names of men with unfamiliar names of women. The second list was reversed with the names of more popular women and unfamiliar men. The respondents erroneously chose the list with the popular names as having the most names.

Saliency is another bias under subject of retrievability (Tversky et al., 1974). This occurs when experiencing something first-hand versus observing it as a spectator has greater impact and makes it easier to retrieve. The experience of witnessing a house burning is more likely to suggest a higher probability of house fire than when you read about it in the paper. The experience will make the probability of house fire seem greater by having the experience than reading about it. Another bias introduced under the category of availability is the bias of imaginability which is based upon how easily relevant instances can be constructed to influence the estimated frequency of these instances. Consider the risk involved in an adventurous expedition. Most individuals perceive this risk based on how easily they can imagine possible events that the expedition cannot handle. Thus the expedition can be made to appear riskier even if the likelihood of the imagined possible events were very unlikely.

Adjustment and Anchoring is Tversky's and Kahneman's third category of heuristic biases (1974). It is based on the premise, that given a varying starting point to solving a given problem, will lead to different estimates. This indicates that the bias based on the initial value or starting point. A sample experiment used to demonstrate this effect was conducted on high school students who were divided into two groups and asked to provide an estimated value for an equation on the blackboard. The equations were exactly the same but the starting points were different. The equation for Group one was  $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = ?$  and the equation for Group two was  $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = ?$ . Both groups were given 5 seconds to solve the equation, which means adjustments had to be made due to the lack of time to solve the equation. The median estimate for Group 1 was 2,250 and the median estimate for Group 2 was 512. The actual answer is 40,320. The relevance is that since the two groups were given different starting points, anchoring caused them to determine the wide variance in estimating. This Bias is known as Insufficient Adjustment. There is another Bias under the Anchoring and Adjustment category that is called the Bias in the evaluation of conjunctive and disjunctive events. To prove this bias, subjects were allowed to bet on one of two possible outcomes in the following 3 events. Therefore, the subjects could only choose one of the three events to make their bet. The first event was to draw a red marble from a bag containing 50% red marbles and 50% white marbles. The second event was to draw a red marble 7 times in succession from a bag containing 10% white marbles and 90% red marbles. The first and second events are known as a Conjunctive Events. The third event was to draw a red marble at least once out of 7 successive tries (with replacement) from a bag containing 90% white marbles and 10% red marbles. This

is known as a Disjunctive Event. A significant majority of those tested choose to bet on the Conjunctive Event even though this event had a .48 probability over the first sample event which had a probability of .50. The Disjunctive Event had a probability of .52 and was chosen the least out of all the subjects tested. This pattern indicates that people tend to overestimate the probability of Conjunctive Events. The anchoring that occurs is related to the significant population size in the Conjunctive Event which makes it appear the most favorable.

This Chapter presented the psychological effects that are introduced during the evaluation and assessment of risk. I initially covered the individual biological biases that can influence our estimation and assessment of risk. In the latter part of the chapter I covered the Psychometric Paradigms that influence our perceptions of risk based on *Heuristics Biases* that are often incorrect and cause us to make unsubstantiated decisions. It is my intent, in the next few chapters, to present an argument for not relying solely on these Psychometric Paradigms and to incorporate a balance of objective qualitative analysis to make the most informed and beneficial decision regarding the assessment, response and management of risk. Based on Tversky and Kahneman, laymen and experienced researchers are all prone to the same biases when they think intuitively about risk. Sole reliance on biases based on heuristics will provide inferior results if they are our sole approach to confronting risk.

## CHAPTER 3

### RISK CULTURES

#### Cultural Influences

It is important to note that the collective attitudes of all people within an organization or society make up the culture. We can see firsthand how risk-averse society has become in reaction to the economy and recent financial instability of major corporations. The financial culture of society has become risk-averse to discretionary spending. This culture has an influence on how project managers invest in riskier type projects. Managers will tend to err on the conservative side during periods of a sluggish economy. In this section I leverage Benjamin Hunt's (2003) book, "The Timid Corporation" to describe the influence culture has on the individual decisions of managers and how the collective attitudes make up the culture. Each entity of Individual and Culture influence each other in a bidirectional relationship. Today's consumer confidence is at its lowest point in decades due to the current state of the economy. When you consider the bailout of top lending institutions, volatility of the stock market and the global recession, it is apparent that there is not much to be confident about. The relevant question is how this affects the risk attitude of the general public, including those in our own organizations. The net effect is a reduction in spending based upon fears of future uncertainty. Risk culture can be defined as shared beliefs, values and knowledge of a collective group of people with a common purpose. The concern for managers is how attitude and culture affect the risk decisions being made within their organizations.

What Hunt was stating has relevance to what is happening today. According to Hunt, social confidence in the future has been low for a number of years. Some of this is due to the collapsing political visions on organizing the world and shaping the future. Recent politicians are more timid and unwilling to take risks. They cling to the safety of the protective frames which are mostly influenced by the voters. According to Hunt, government corruption has made society skeptical to some extent. Recent issues concerning integrity in political office have resulted in politicians retreating from their strong beliefs because they are viewed as radical by the voters. Hunt believes “Politics is now dominated by a bland pragmatism.” (2003) However, politics is not the only influence on risk culture of society.

The recent bailouts, recession and market volatility have investors and managers overly conservative in their approach to risk. The past privatizations of the British Railroad and the energy industry in California have proven to be disastrous, lowering confidence in the free market. The fear is that the free market requires constant re-regulation. Global warming and other environmental issues are becoming more prevalent. Resource depletions are causing supply shortages which are driving prices upward while the recent recession is driving some prices downward. Globalization has caused local, destructive impacts due to global competition. Terrorism also has made a severe impact on societies’ confidence of the future. All of these issues have created a pessimistic outlook of the future.

A consequence to all pessimism is business listens to society and responds by what Hunt calls “Institutionalizing irrational caution.” (Hunt, 2003) Corporations can suffer from a breakdown in trust between managers and shareholders. The relatively

recent crises at Enron, Arthur Andersen and WorldCom have made shareholders distrustful of managers which forces tighter controls on financial principles. This new form of self-regulation allows little authority of management's tolerance of risk and uncertainty. Corporate trust is not the only issue influencing risk attitudes in business. Sins of the past on commercializing products have stifled innovations due to lack of risk tolerance in R&D investments. Anxiety of what might go wrong has stifled ambitious thinking and generated a loss of pioneering spirit. Managers' fears from unpredictability have created new commercial risk-averse practices.

The relevance of these influences is the direct impacts they have on how today managers approach issues involving uncertainty. The loss of conviction based on the assumption that corporations cannot shape their future has a disturbing consequence. Managers see themselves now as victims of these influences discussed above. In 2003 Hunt believed that society was talking itself into a recession based on prolonged feelings of pessimism (2003). He believed that managers acted more on fear of what might happen than on strong beliefs on how to shape the future. I believe recent decline in the economy, employment and other factors are evidence of what Hunt was claiming.

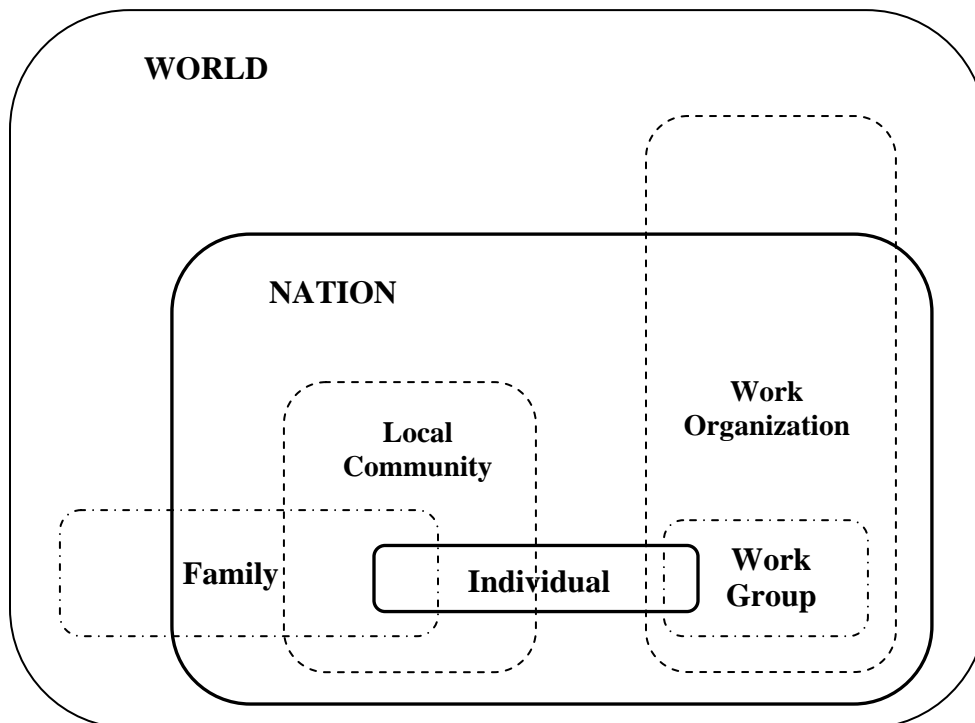
### Risk Attitudes

Attitude can be defined in two different ways. The first definition is based on physical position. The more relevant definition is based on state of mind. The latter definition of attitude correlates best to the context of this thesis. The term attitude is a mental point of view based on a fact or opinion. David Hillson (2007), author of "Understanding and Managing Risk Attitude," refers to attitudes as human mental

processes or positioning that influence chosen responses to situations. Perception is a key driver of attitude and the way individuals or groups adopt attitudes in situations is the focus of this section. The intent of this section is to understand the human factors that influence risk attitude and the emotional literacy approaches to shaping our attitude, produce appropriate responses to risk (Hunt, 2003:91).

In the Chapter 3 of this thesis, we covered risk culture and some of its influences. According to Hillson, the same cultural influences form a hierarchical set of influences over the individual's risk attitude. Risk attitudes occur at each level of the hierarchy which forms the individual attitude at the base of the hierarchy. Figure 4 presents Hillson's hierarchy matrix.

Figure 4. Hierarchies of Membership and Influence (Hillson, 2007)



In the previous section on risk culture, we reviewed the factors at the world and national level that influence both culture and attitude. There are lower levels of the hierarchy, such as organization, group and individual, which have a stronger influence. Organizational factors include policy, standards, senior management style, type of industry and market position. Group factors are comprised of leadership style, communication approach, coordination, empowerment and task focus. Individual factors consist of competence, capability, skills, knowledge, experiences, stress, motivation, emotional health and background. All of these factors drive our attitude and influence our typical responses to risk and uncertainty. This influence can be neutral, positive or negative.

An example of a negative outcome due to being overly risk-averse includes setting high contingency levels which reduce funding for other purposes. Penalizing staff for taking risk is viewed as irresponsible. Over-caution leads to loss of opportunity and maintaining the status quo, and consequently destroys innovation. As individuals, over risk aversion can cause us to be pessimistic and concentrate on obscure uncertainties with almost no probability of occurrence. We can become paralyzed by the thought of the impact, to the point where we don't consider the low likelihood of occurrence of it ever happening. We need to recognize and manage our impulse to immediately respond by transfer of risk before we perform any type of assessment and then abdicate our responsibility once transfer is agreed.

On the other hand, overly risk-seeking attitudes can cause organizations to become overconfident and set low contingency levels in project budgets and schedules which will limit our ability to respond to risks. Risk-seeking influences can cause us to



under invest in risk management and spend resources on fire fighting and crisis management. As individuals, being overly risk-seeking causes us to focus on the probability more than the impacts when it comes to evaluating threats. The over confidence of being overly risk-seeking causes us to accept threats passively or ignore them by over relying on contingency plans. Relaxed attitudes breed content and lack of commitment to perform proactive actions which is the basis for managing risk.

The optimally risk mature environment has a balance of risk-seeking and risk-averse attitudes that do not leave us exposed to risk or have us so overly cautious that we can't take advantage of any opportunity. What kind of system of checks and balances can be deployed to ensure our organization doesn't lean too far in either direction? One of the concepts that Hillson talks about is balancing attitudes within groups as a means of ensuring we have the proper balance (Hillson, 2003). This is not a simple task because attitude is situational. It would require each team member to choose an attitude from among the range and ensure the entire range is represented within the membership. The next requirement is for each member to have the self-awareness of their risk attitude to ensure they are truly representative. This is extremely difficult to do because other group dynamics, such as group think, would eventually prevail.

### Emotional Literacy

In recent decades Emotional Intelligence has been gaining notoriety as another measure of intellectual competence (Hunt, 2007:91). It is described as the instinctive feelings that arise spontaneously rather than through conscious effort and are often accompanied with physiological change. Emotionally literate individuals are able to

recognize, understand and control these feelings. According to Daniel Goldman (1995), author of “Emotional Intelligence: Why it can matter more than IQ,” there is a high degree of relevance to risk attitude because emotions left unchecked can hijack our logic and reasoning, causing us to adjust our attitude based on this normally irrational dimension.

Implementing risk management methods require implementing solutions through others, which requires managing our own emotions (intrapersonally) and managing though other’s emotions (interpersonally). Those successful in controlling and harnessing emotions for positive results have a high level of empathy and self-awareness. Hillson refers to self-awareness as “Knowing yourself well enough that you don’t get in the way of the situation.” (Hillson, 2007) Hillson is stating that effective attitudes and decisions towards risk begin with individuals being cognizant of emotions that drive decisions and could interfere with rational analysis and logical reasoning used to formulate our attitudes.

A popular example of how emotions can affect our attitude is the introduction of new technology into an organization. I think everyone has experienced a time when they were confronted with learning something technically advanced and feeling intimidated. A natural emotional reaction is to become anxious and frustrated. We eventually work through these frustrations and adapt to the new technology. However, the experience of going though drastic change has a traumatizing affect. The next time we experience any new technology, the emotions caused by the initial experience cause us to retain a negative and pessimistic attitude which then results in immediate transfer of any risk. In

situations confronting the risk, emotions can get the best of us and cause us to hide behind others who claim to have the expertise, by transferring the risk to them.

There are several resources available for measuring Emotional Intelligence and what I have observed is that they follow very similar criteria for determining what the experts call EQ (Emotional Quotient) (Goldman, 1995). They have incorporated different scaling factors but mostly follow the same decisive factors. Table 1 presents an outline of these factors that are common among emotional literacy tools

Table 1. Emotional Intelligence Competency Tools (Hillson, 2007)

- **Awareness Skills**
  - Emotional Self-Awareness
  - Emotional Management
  - Assertiveness
  - Goal Achievement
  - Optimism
- **Behavioral Skills**
  - Independence
  - Stress Management
  - Impulse Control
  - Conflict Management
- **Contact Skills**
  - Relationship Building
  - Empathy
  - Social responsibility
- **Decision Making Skills**
  - Problem Identification
  - Creativity
  - Selecting Solutions
  - Reality Testing

## CHAPTER 4

### RISK MATURITY

#### Relevance to Attitude and Management Maturity

There are a few determinants that make up the risk management maturity (Hillson, 2007) level of organizations, and culture is the most predominant. The most critical success factor to implementing an effective risk management methodology is an appropriate and mature risk culture. Without a proper culture in place, process, applications and experience are formalities. Until organizations address their cultural risk maturity, the methodologies become obscure formalities. The problem with ineffective risk management is not the tools but how it is implemented. Risk maturity must be present as a critical foundation to begin a risk management implementation. In this chapter we will review what we have discussed in the previous sections and the relevance to healthy risk culture. I close this section with the Risk Management Maturity Model (Hillson, 2007) and the significance of culture in this model.

At this point, I think it is important to summarize what I have covered previously, and the relevance it has on implementing a successful Risk Management program into an organization. In the first three chapters I talked about human behaviors towards risk. In these chapters I covered individual behavior such as protective frames and how they influence our tendency towards either risk-seeking or risk-aversion. We then covered Psychometric paradigms and their influence on our decisions involving risk. Another critical influence we discussed was heuristic biases and how they influence our reactions towards risk. Our last topic was risk attitudes and how they can affect our risk culture.

At this point we need to discuss how this all comes together and the relationship each concept has on risk culture and risk maturity.

Protective frames, psychometric paradigms, heuristic biases and emotional literacy play roles in determining each individual's risk attitude. Protective frames are what determine our initial attitude towards a particular risk situation because they define our mental state-of-being related to boredom, excitement, relaxation, and anxiety (Apter, 1992). Psychometric paradigms influence our risk attitude due to the nature of how popular beliefs and public viewpoints affect our priorities towards risk. Heuristic biases influence our attitudes and decisions towards risk because they subconsciously control our perceptions based on perceived associations of probabilities and impacts. Emotional literacy was the final concept introduced as an influence over our risk attitudes. Those emotions that can cause us to be overly risk-averse or overly risk-seeking need to be controlled for they can degrade our ability to analyze logically and reason. All of these factors described have a strong affect on our beliefs and understandings of risk. As managers of human resources assigned to projects and operations we need to be cognizant of these influences. Our objective as managers is to seek the most optimal balance of attitudes and control the detrimental affects from an unbalanced range of attitudes. Figure 5 helps depict the relationship between the influences of attitude and culture.

Figure 5. Influences of Attitude and Culture

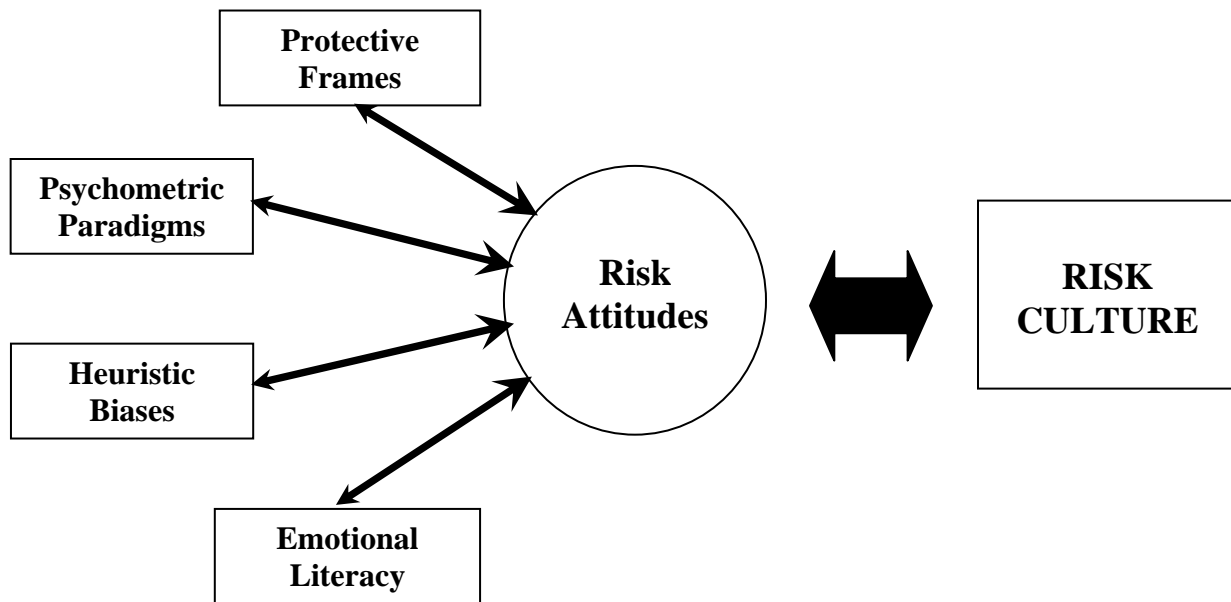


Figure 5 depicts how culture ultimately becomes the output of the entire process. It is important to note that culture is bidirectional and feeds back on attitudes influencing the same factors. Developing the right culture is probably the most critical step in becoming a mature organization. Overcoming the mental hurdles that stem from the influences on attitude and developing the proper balance of risk attitude is critical to the success of a mature risk culture and is the basis of this thesis. A strong cultural foundation is key to achieving a mature competency level which will be discussed further in the following paragraphs.

### Risk Management Maturity

The Risk Management Maturity model was established as a means to benchmark management ability to implement best practice in risk management against objective standards (Hillson, 2007). The model incorporates 4 levels of competency in deployment of the best practices that include Naïve (Level 1), Novice (Level 2), Normalized (Level 3) and Natural (Level 4). The objective of the model is to achieve and maintain a flexible culture that can modify risk attitudes towards changes in their environment to reach an optimal balance between Risk-Adversity and Risk-Seeking.

Naïve or Level 1 maturity is characterized by an organization that is unaware of the existence of risk management methodologies (Hillson, 2007). There is basically no formal structure or approach to managing risk which is often dealt with in the form of crisis management. Novice or Level 2 maturity is recognized through a small group of nominated individuals in the organization that have some familiarity with risk management best practices. There is no formal implementation but there is potential based on the interest of the few. Normalized or Level 3 maturity is realized when risk management best practices have become embedded into the business processes. In this phase most projects have incorporated the best practices into their lifecycle. At this phase the majority of organizations will be satisfied at their level of competency. The final phase is Natural or Level 4, which is where the entire culture of the organization has self-awareness of their approach to risk management. In this phase the organization is proactively looking for opportunities to exploit risks strategically by using them for competitive advantage. The level 4 organization is not only identifying threats but also seeking opportunities it can leverage. Risk information is fed back into the organization to improve business process and organizational potential.

Within the four levels of Risk Management Maturity there are four attributes that can be utilized as criteria for standard evaluation of an organization's maturity level. The four attributes are culture, process, experience and application (Hillson, 2007). These are described as follows.

Level 1: Attributes are at the lowest levels. Culture is based on resistance to change and there is no awareness for the need to manage risk. There are no processes and subsequently there is no experience and no application of risk management in any business process.

Level 2: The organization is not convinced that there is any value and therefore views risk management as an overhead. Processes are ad-hoc based on the small amount of experience within the organization. Application is deployed in patches and not to any significant extent.

Level 3: Recognizes the existence of risk and the necessity to manage it to capture the benefits of a normalized program. The process is matrixed within the business process and resources are allocated accordingly. Application is uniform across business areas.

Level 4: Proactive risk management through self awareness and monitoring. The culture is based on consistent seeking of exploiting risk opportunities with the perfect balance of risk-aversion and risk-seeking. Best practice processes are enacted and benchmarked against top performers. Experience within all levels of the organization and application is part of the lifestyle of the organization.



Hillson's maturity hierarchy of attribute levels can be used as standard criteria against which organizations can be assessed. Below is a matrix to score your organization's maturity level using standard language descriptions as a guide for objectiveness (see Table 2). This matrix is adapted from Hillson's chart of diagnostic characteristics within each attribute.

Table 2: Risk Maturity Level Criteria (Hillson, 2007)

Descriptions	Level 1	Level 2	Level 3	Level 4
<b>Culture</b>				
Risk Awareness	None	Low	Aware	Proactive
Commitment to Risk Mgt.	Reluctance	Curious	Implemented	Top-down
Risk Style	Reactive	Ineffective	Formalized	Rewarded
Expectation of Benefits	None	Some	Understood	Opportunistic
Attitude to change	Resistant	Open	Expected	In search of
<b>Process</b>				
Formality	None	Some	Applied	Embedded
Stability	Volatile	Patchy	Prepared	Rooted
Effectiveness	None	Fairly	Observed	Exceeds
Integration	None	Partial	Fully	Lifestyle
Independence	Dependant	Fractional	Complete	Routine
<b>Experience</b>				
Breadth of Experience	Unknown	Limited	In-house	Universal
Understanding of Principles	None	Little	Fundamental	2 <sup>nd</sup> Nature
Practical Skills	None	Some	Basic	Paramount
Training Policy	None	Informal	Formal	Self-Learning
Learning from experience	Knee-jerk	Familiar	Methodical	Heuristic
<b>Application</b>				
Scope	None	Partial	Full	Exceeding
Consistency	None	Variable	Routine	2 <sup>nd</sup> Nature
Resources	None	Few	Dedicated	Everyone
Tools	None	Adhoc	Integrated	State-of-Art
Use of Data	None	Consequential	Control	Quality loop

## CHAPTER 5

### RISK MANAGEMENT APPROACH

#### Exploiting Positive Risk

Now that we have reached the point of this thesis where we begin to cover the practical approach to managing risk, it is critical that we have addressed all of the cultural and organizational concerns surrounding attitude and maturity. If we expect to maintain a sustainable process, we must ensure that the right culture is in place or is moving in the right direction. It is possible to introduce the risk management methodology as part of the change agent of culture. However, to make the process more than just a formality, there must be a mature culture in place.

For the remainder of the thesis I follow Hillson's five step approach to managing risk. The 5 steps are Definition, Identification, Assessment, Response Planning and Monitoring (Hillson, 2004). The difference between Hillson's process and others is that his approach does not just focus on potential negative threats. His and PMBOK's (Project Management Institute, 2003) approach also look for hidden advantages as opportunities. During the Definition phase we clarify objectives and define process. The Identification Phase includes documenting threats and opportunities. The next step is the Assessment phase, where we describe the risk in terms of probability and impact. During the next phase, Response Planning, we prioritize and develop our response plan for each threat or opportunity. The last phase is the Monitoring phase, where we systematically review the responses for the expected results and reporting to stakeholders on the progress. As we go through each phase in a little more detail it is important to note the treatment of opportunity because this is the major difference between typical risk

management approaches and Hillson's, PMI's and APM's approach (Association for Project Management). It is also important to note that Hillson's methodology is concentrated on Project risk. However, these same principles apply to managing risk in operations or administration functions.

Definition naturally involves defining the details of the risk management process. In this phase it is important to define the objectives of the project to ensure that any risk identified is truly relevant (Hillson, 2004). The next purpose of the Definition phase is to agree on the scope and objectives of how risk management will be deployed. It is crucial at this point of the project to get stakeholder agreement on how risk will be managed because it is highly possible that the stakeholders will have risk responses assigned to them. It is at this point that everyone understands their role in the process to avoid any future surprises. This is also the time to introduce the concept of opportunity management and how it fits into the process.

Identification of risk includes exposing those threats and opportunities that affect the objectives of the project or organization (Hillson, 2004). This is probably one of the most difficult steps in the process because you are asking stakeholders to be forward thinking. Focusing on what could potentially go wrong is not pleasant and is often avoided, which makes this step of the process so difficult. Most of this is done within workshops or brainstorming sessions with stakeholders who are subject matter experts in the type of project being performed. Hillson also suggest a number of tools and techniques to get the team focused on the potential threats and opportunities. Walking the team through the project plan or work breakdown structure will often create some conversation on where are the potentials. Once we have identified potentials, it is import

to have a comprehensive tracking tool. This is where Hillson introduces the Risk Register, which is the primary tool for assigning ownership, prioritizing and tracking the progress of managing each threat and opportunity throughout the lifecycle of the project (Hillson, 2004).

Assessment can be conducted by following qualitative or quantitative measures. Qualitative Assessment utilizes descriptive language and attributes to determine the magnitude of probability and impact. These attributes include triggers, potential impact, probability of occurrence and duration and timing of risk. These attributes or characteristics are recorded in the Risk Register. Risk level scores are also recorded in a Probability – Impact grid which prioritizes those risks most threatening or opportunistic. Quantitative Assessment includes statistical modeling techniques such as the Monte Carlo simulation to produce possible project outcomes. These outcomes show what might or might not happen to the project if the risk did or did not occur. This analysis is used to expose areas of the project that are at the most risk. Quantitative assessment uses numbers to represent dimensions of each risk which is performed during the Quantitative analysis. The Qualitative process uses words such as low, medium and high to describe each risk.

Response Planning occurs once all of the identified risks have been assessed for significance (Hillson, 2004). This phase requires risk owners to adopt the best strategic approach that's appropriate for each risk. The approach is based on nature, severity and manageability. Typical threat response strategies include avoidance, transfer, mitigation and acceptance. Avoidance is usually accomplished by targeting the root cause and removing it as the source (Hillson, 2007). It is also possible to execute the project in a

different manner that avoids the cause but still targets the same objectives of the project. Transfer is a very popular response strategy because it involves the least effort on the part of the project team but it could prove to be the most costly. The strategy involves finding another party to bear the liability of the impact. This is often done through insurance policies and fixed price contracting or contracting consultants. The objective is to pass the liability to a party with the best expertise to manage it effectively. Mitigation response requires reduction of either factor of probability or impact. Reducing the severity of impact or the probability of occurrence lessens the team's overall exposure. Deploying proper technologies and assigning ownership to those stakeholders with the most experience often reduces probability or impact. Acceptance is the last resort of all the response strategies and it requires contingency planning. Active risk acceptance includes planning of time, funding and resources to account for the risk. Passive risk acceptance is a more general approach that involves development of a risk-aware culture and embedding risk management into routine business processes.

It is also important to note that Response Planning will sometimes require decisions on possible options identified during assessment. This is not highly prevalent in projects but operation managers face these types of decisions frequently. There are theoretical differences between risk and uncertainty that must be considered when planning risk responses. Risk can be considered Aleatoric, which refers to uncertainty situations when measurable factors can take one of a range of known possible outcomes and probability. Uncertainty is considered as Epistemic, which is when we are not certain that a particular event will happen at all. It is the uncertainty derived from something unforeseen that might occur. Our method of response mitigation is dependent

on either type. The tools typically used by professionals managing aleatoric risk are EV (Expectancy Value) and Decision Trees. These tools utilize weights and probabilities tied to financial impact to determine an expected value for each path option. These professionals are not limited to these tools and it is important to note that there are other methodologies for making these types of risk decisions.

Monitoring and Controlling are part of the everyday project management accountabilities for all activities (Hillson, 2004). For the purpose of managing risk, we refer to those response plans and the severity of probability and impact. High and moderate level risk response plans become embedded into the project plan. Periodic adjustments may require reassessment and re-planning responses as new risks arise or existing risks are reduced. Conducting regular risk reviews and reporting back to stakeholders is part of the process.

It is important to understand Hillson's approach to the risk management process introduces the concept of opportunity management. If you go back to the description of the Level 4 Mature organization, you'll find exploiting opportunities as one of the key characteristics. Embedded in each of the Risk Management processes are the Definition, Identification, Assessment, Response Planning and Controlling of potential opportunities. This is the key difference between traditional approaches to managing risk and Hillson's approach (2004).

## CHAPTER 6

### CASE STUDY: RISK MANAGEMENT IMPLEMENTATION

#### Introduction

This case study was the basis of this thesis and was part of the Team Strategy Project under Organizational Dynamic's P3 curriculum at the University of Pennsylvania. The study began as idea between Robert Corso and me regarding our own organization's lack of risk management best practices. We developed the idea as part of the P3 curriculum requirements. We wanted to find some way to satisfy the Strategy requirements and provide something valuable to our organization that afforded a return on their educational investment in Robert and me.

We started with a proposal to our director inside the Information Technology (IT) department. Inside the proposal was our value proposition to the organization for a repeatable and sustainable risk management methodology for the Project Management Office. Bob and I were apprehensive about how receptive the director would be in allowing us to interrupt the organization to pursue this best practice. Luckily for us she was familiar with the practice as part of a previous organization and she was 100% behind us. She had our proposal put on the agenda for the IT Senior Leadership Team (SLT) that was headed by the Vice President of Information Technology. The proposal was unanimously approved with much excitement within the SLT.

The proposal included our plan for developing training material that would begin with the benefits to both the organization and each project manager being trained. The plan also included all the logistics of who to train, when to train them and where to provide the training. The final objective in the plan was to introduce something in the

methodology that would make it a sustainable practice. We decided to embed the risk management methodology into our System Development Lifecycle (SDLC). The lifecycle is also a best practice within the Information Technology industry which includes a series of checkpoints that follow each phase of the lifecycle. We decided to include Risk Management deliverables at each phase and train the Project Management Office (PMO) how to monitor and audit the process to make it sustainable.

The training was well received by the project manager and the PMO because we gave them something that not only benefited the organization but also provided benefit to each individual. However, not everyone shared the same excitement as Bob and me. Some viewed the process as extra work. With nobody in the PMO to encourage the project managers (PM) and remind them of the benefits, the process soon became a formality for a large number of PMs. They followed the process but without the enthusiasm to ensure they were capturing all the risk and planning the appropriate responses. The next phase of our implementation is to go back and reinforce the concept and work with those who are only going through the motions.

The next section outlines our case study which includes background of the organization, Value Proposition, Approach, Detailed Plan, Final Results and Lessons Learned. In the case study we describe the current organization's maturity level for Risk Management. I cover our approach to developing the training material and how to present. Then we describe how we intend to make it a sustainable process. Lastly, we discuss the lessons Learned regarding the maturity level of the organization and the acceptance of the new methodology.



## Case Study

This case study is based on the Project Risk Management implementation at a power generation and distribution utility in the northeast United States. The Enterprise Corporation is the entity that owns and operates Electric & Gas Utility. The Enterprise also operates a Services Corporation which provides centralized services to each of the lines of business that operate under the enterprise umbrella. Within the Service Corp. there is an Information Technology Department that provides all the Information Technology services for the enterprise operating companies. The primary objective of the IT department is to manage all of the IT Operation, Maintenance and Investment costs for enterprise, which include the IT Project Portfolio, which is where we will focus our discussion for the purposes of this study.

The Information Technology Project Management Office (PMO) is the primary team accountable for the portfolio of Information Technology projects. This organization provides the standards and governance on all IT project initiatives. The PMO is fairly mature in incorporating industry-wide best practices for IT Project Management. One of the practices they manage is the Project Development Life Cycle (PDLC) model, which documents the end-to-end process for Hardware and Software development projects within the organization. The PDLC incorporates industry best practices in *Proposal Development, Project Estimation, Testing Methodologies, Change Management and Project Controls*. However, in the past, managing risk is one particular area where the PMO has not progressed in terms of maturity.

Risk Management in the previous operating environment of the IT PMO is almost non-existent. The only mention of managing risk was found in the project proposal document where the PM is accountable to provide risk and contingency costs into the project estimate. However, there is no formal process for determining this cost other than an educated guess based on past experiences and the relative maturity of the technology being deployed. This usually results in a gut feeling percentage of the total project which is applied to the total project cost. That is the extent of risk evaluation. The percentage that is applied is based on a confidence factor estimated by the PM. There is no objective process to determine the validity of this risk estimate nor is there any further analysis performed to monitor these risks. This is where our case study had a great opportunity for process improvement.

### Background

The Risk Attitude and Risk culture within the IT organization is extremely risk averse due to the historical nature of the company from its origin and the utility industry as a whole. For the most part, utilities have been awarded franchise territories with guaranteed returns on their infrastructure investment. Even though the returns were relatively moderate, they discourage any risk-reward opportunities. This formed a risk-averse culture over the years. Now that an increasing number of states have a de-regulated utility market, utilities are becoming increasingly more risk-seeking. This means they must become competent at managing risk.

The IT organization will need to take a more proactive approach to managing risk while looking for opportunities and threats. The company needs a catalyst to serve as a change agent to drive this culture change. It was our hope that the introduction of the new Risk Management methodology will serve as the change agent. Discussion and open collaboration needs to be encouraged versus the avoided conversation that exists today.

### Value Proposition

When you look at project investments across all industries you'll see that Information Technology projects have the highest betas when calculating weighted cost of capital. This is mainly due to poor success rates of IT projects in general. That is why Risk Management in the IT investment community is a critical process that needs to be incorporated into the Product Development Life Cycle.

Our primary objective is to reduce risk and contingency spending and planning costs associated with Information Technology projects through a proven *Risk Management* methodology. In addition we would like to change current approach to risk management from a 100% subjective viewpoint to the objective methodology presented in our course. We ultimately would like to create a culture that proactively manages risk by actively seeking opportunities as well as threats. Implementation of a formal training program on the proven methodology will reinforce the concepts in the methodology and a formal *Governance Model* that incorporates the *Risk Management* methodology inside the current PDLC.

Our goal was to integrate the Risk Management methodology inside our Product Development Lifecycle. Part of our deliverable in the case study was to provide a revised PDLC document that incorporates the Risk Management deliverables for each phase of the project. In addition, to the revised PDLC, a formal knowledge transfer provided to the PMO will allow the team to effectively audit the process during checkpoints at the end of each phase in the lifecycle.

### Approach

The approach taken for this Team Strategy was divided into five parts, 1) Obtain Sponsorship, 2) Training, 3) Incorporation into the Project Development Life Cycle, 4) Auditing, and 5) Measures for success. A new Director in the IT department had previously utilized project risk management as a part of her former company's project development lifecycle. After meeting with her and reviewing our plans she became a champion of this effort and helped us sell it to senior management. We then met with our PMO management team and proposed a pilot for one of their current projects. Appendix "A" contains a Risk Register, Appendix "B" contains a Risk PI Matrix (A-2) and Appendix "C" contains a Risk Response Matrix. These documents were created during this pilot project. Additional documents to help with the management of risk were also created and can be found in the appendix. Once the pilot was started and some initial adjustments made, the Risk Management plan was presented to the CIO/VP of the Information Technology department and his direct reports. Approvals were eventually secured and the program was officially under way.

With approvals obtained, a project schedule was created and the Training Phase of the project was begun. During the Training Phase, the PMO identified IT department associates that played a role in the management of IT projects. Approximately 30 associates were identified for training. During this same timeframe, the curriculum was developed to teach the associates the Risk Management methodology and how it would be incorporated into the Information Technology department's current PDLC process. Two separate, full day classes were taught using the information mainly learned through the DYNAM605 Assessing & Managing Project Risk course taught at the University of Pennsylvania.

Working with the IT PMO we were able to incorporate Risk Management deliverables into our existing PDLC process. A matrix was developed that specified where in the process certain documents were to be created, when they were to be updated and whether they were mandatory or optional. The matrix, termed the CUMO (Create/Update/Mandatory/Optional) was tailored to fit projects of various durations and costs. A copy of the CUMO matrix can be found in Appendix E.

No process, regardless of how good, is effective if it is not embraced by the organization. To this end we worked with our PMO to modify the existing Product Development Checkpoint (PDC) accountability matrix with the various Risk Management documents that will be reviewed during project checkpoints. These checkpoints are conducted by the PMO at the end of each phase of the project lifecycle and verify that the project has successfully completed the previous phase and that all required documentation has been created. The new documents required through the

introduction of the project Risk Management process are marked in red on the document in Appendix D.

In addition to the checkpoints an “Enabling Technologies – Risk Management Process” guide was developed for IT Project Management. This document touches the major points of the Project Risk Management process and offers examples of the key Risk Management documents including the Risk Matrix, the Risk Register and an individual Risk Response sheet.

The final part of our approach was to establish measures that would demonstrate the effectiveness of the Project Risk Management program. Measures will be categorized in three ways. First, the PMO will be looking for improvements in our overall success in the delivery of our IT projects. As mentioned earlier IT projects in general have a high failure rate. By incorporating this program into our PDLC the PMO expects to improve the completion rate of projects started within the IT department. Second, unexpected costs and schedule slips should be reduced. By planning for possible threats, action plans will be in place to reduce the probability and/or impact that threat would have on the project. With action plans in place the costs associated with those threats will be minimized. Lastly, the future goal is to be able to return funding allocated for Risk and Contingency as the project progresses through its lifecycle. As identified risks are eliminated or mitigated the dollars associated with those risks can be released from the project and be allocated for other investments.

The case study was conducted primarily during non-work hours except during training which was delivered during a combination of work and lunch-time hours. In order to gain the most value from the addition of the IT Project Risk Management

process it was anticipated that the process would be incorporated into the IT PMO process by the end of 1<sup>st</sup> Quarter, 2008. This was planned to allow for a large number of IT projects planned for 2008 to utilize the new process. The following is a high-level schedule of activities and deliverables (see Table 3):

Table 3. Case Study Schedule of Activities

<u>ACTIVITY</u>	<u>DATES</u>
1. Pilot Risk Process (Start)	01/01/08 thru 01/31/08
2. Develop the IT Project RM Process	01/01/08 thru 01/31/08
3. Develop Training Materials	01/15/08 thru 03/24/08
4. Conduct Training Sessions	
1) IT Project Risk Program – Overview	03/19/08
2) IT Project Risk Program - Risk Identification	03/19/08
3) IT Project Risk Program - Risk Assessment	03/19/08
4) IT Project Risk Program - Risk Analysis	03/21/08
5) IT Project Risk Program - Risk Handling	03/21/08
6) IT Project Risk Program – Workshop	03/21/08
5. Develop Governance Model for New Process	03/14/08
6. Revise Proposal Process to add Risk Assessment	03/19/08
7. Incorporation into the IT PDLC Process	03/21/08
8. Turnover to IT Project Management Office	03/31/08
9. Surveys and Follow-up	04/01/08 thru 04/30/08

## Results

As a result of this program the IT Department has implemented Project Risk Management into its PDLC. Department leadership, including the Vice President and CIO, has fully endorsed the use of the program we developed and taught, as a required

part of our business operating model. Course materials have been developed and 30 associates were formally trained. Feedback from the associates trained has been very positive. The only concern is the perceived additional workload that the program will require from Project Managers. Future training is being scheduled where the PMO will be conducting the training given under our guidance. The satisfaction level and user acceptance for this case study was very high and we hope to build upon this enthusiasm to reinforce a mature culture.

The Risk Attitude and Risk Culture within the IT organization is risk-averse. Strangely, previous attention to risk as it pertained to Information Technology projects was just a guess or was not considered at all. The Project Risk Management program introduced as a result of the materials studied through the P3 program at the University of Pennsylvania is a significant step at changing the current ad-hoc process by making it a formal-structured, business process. The implementation of Project Risk Management changes the way IT does business by permitting the IT department to appropriately manage the risk of millions of dollars spent each year on new and improved IT initiatives.

#### Successes and Short-falls

It has been my experience, that the three most critical pieces to a successful Information Technology project is People, Process and System. The humane aspect (People) of introducing any change into an organization is the most difficult challenge. Some of this resistance to change is related to the theories described in previous chapters and other human behaviors towards Change Management are beyond the scope of this thesis. Introducing the Risk Management methodology into the IT PMO organization



was no exception. Our long-term goal of the implementation was to begin a journey to risk maturity. The advent of this journey afforded us the opportunity to realize some initial successes and some short-falls.

Increased awareness of the proactive alternatives in the methodology was a primary success of the implementation. Before we introduced the concepts, Project Managers (PMs) were unaware of this fact. This is the first step in the maturity journey. Since PMs are aware they now proactively brainstorm during the planning phase to identify potential risks. The training we performed armed each PM with a source of reference to utilize as they grow in risk maturity. The increased awareness and proactive brainstorming has caused an increase in contingency planning which has resulted in quicker responses to threats as they come to fruition.

These successes came at the expense of some trial and error. Some of the shortfalls we observed were typical of implementations of this magnitude. Not every stakeholder was able to understand the benefits related to the methodology. Unless there is a perceived benefit there is little motivation to make the necessary changes. We still have PMs reliant on those biases for the smaller scope projects within the PMO. Much of this can be attributed to the time constraints that we had during post rollout support. One of the struggles we have as PMs integrate the methodology into their projects is the reluctance of ownership by the stakeholders. Initially they are excited about the identification of risks but as soon as they are assigned to the response, they shy away from the risk. This is why it is so difficult to get them to identify any new risk during later phases of the project. They are reluctant because they know it means more work.

The benefits still need to be reinforced to maintain the proactive mindset within the organization

### Lesson Learned

In retrospect, I think our excitement of introducing the new practice was overcome by the unwillingness of some of the participants. It may have been naive of us to believe we could simply train and others will follow. What we didn't realize was the risk maturity level of the organization wasn't at a level for acceptance. Project managers fell back on those Biases, Protective Frame and Paradigms that they used as crutches for the purpose of their approach to risk.

If you look back to the model presented on page 28 that depicts these hurdles and their influence on attitude and culture, you understand how they made the implementation a difficult challenge. Some of project manager's reverted back to their old habits based on the biases and paradigms. As a result they developed contingency budgets that were grossly overestimated.

My next step is to leverage what was learned during the development of this thesis to address the mental roadblocks described in the previous paragraph. I plan to meet with the Project Managers to capture their opinions and feelings about the practice with hopes of addressing the roadblocks to reaching the next level of risk maturity within the organization. My plan is to dive deeper into Hillson's concepts on maturity to influence the attitudes and culture to accept the best practices more openly.

## CHAPTER 7

### CONCLUSION

The original focus of this thesis was human behavior and the psychological aspects of our approach to risk and uncertainty. We reviewed those aspects of protective frames, heuristic biases and psychometric paradigms for their influence on risk attitude and ultimately on our risk culture. Our understanding of these influences should drive our actions as managers to remove these potential barriers and build a culture that is mature in risk awareness. What we learned is that it is not enough to implement best practices and formal methodologies. Without the right culture, there is nothing to keep these new practices from being a passing fad. Our goal should be to maintain a sustainable level of maturity to reap the benefits of the process. We can do this by first reaching an optimal balance of risk-aversion and risk-seeking.

It is safe to say, without any formal risk management process, the maturity level of the IT organization was at the lower end of the spectrum. Prior to the case study, there were pockets of interest within the organization and some scattered knowledge of the principles. Based on these characteristics, the RM Maturity Model indicates that the organization is at Maturity Level 2. Our journey doesn't end now because we implemented the process. Our objective after this initial case study is to measure its effectiveness in the organization and determine what we do next to reinforce our drive towards Risk Maturity and to ensure our progress never ends.

## REFERENCES

- Apter, M. J. 1992. *The Dangerous Edge*, New York: Free Press.
- Breakwell, G. M. 2007. *The Psychology of Risk*, Cambridge: Cambridge University Press.
- Fischhoff, B. & Lichtenstein, S. & Slovic, P. & Derby, S. L. & Keeney, R. L. 1983, *Acceptable Risk*, Cambridge: Cambridge University Press.
- Goldman, D. 1995. *Emotional Intelligence: Why it can matter more than IQ*, New York: Bantam Doubleday Dell Publishing Group, Inc.
- Hillson, D. A. 2004. *Effective Opportunity Management for Projects*, Boca Raton, FL: Taylor & Francis Group, LLC.
- Hillson, D. A. & Murray-Webster, R. 2007. *Understanding and Managing Risk Attitude*, Burlington, Vt.: Grower Publishing Co.
- Hunt, B. 2003. *The Timid Corporation: why business is terrified of taking risk*, Hoboken, NJ: John Wiley & Sons Ltd.
- Project Management Institute, 2004. *A Guide to the Project Management Body of Knowledge*, Evanston, IL: EIS Digital Publishing Inc.
- Tversky, A. & Kahneman, D. 1974. Judgment under Uncertainty: Heuristic and Biases. *Science, New Series*, Vol.185 (4157): 1124-1131.

Risk Register

A		C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	Assessment Date:															
2	Project:															
3	Total Cost:															
4																
5																
6																
7																
8	No.	Impact Area	Source	Risk Factor	Risk Description (Meta-Laageage)	Risk Type (T.O)	Probability	Impact	Estimated Impact Cost	Score	Impact Cost / Total Cost	Risk Status	Risk Response	Responsible Person	Status	
54	046	Change Mgmt		Training for every role may be incomplete causing last minute, additional training.	Training for every role may be incomplete causing last minute, additional training.	Threat	2	3	\$ 300,000	6	0.98%	GREEN	MITIGATE - Monitor development schedule closely. Acquire additional resources if	Helen Vela	Active	
55	047	Change Mgmt		Number of internal trainers (BU & Mast) may not be sufficient to meet planned schedule.	Number of internal trainers (BU & Mast) may not be sufficient to meet planned schedule causing more trainers to be needed.	Threat	2	3	\$ 150,000	6	0.49%	GREEN	MITIGATE - Work with Edison Training Center to acquire existing training resources.	Tom Angelillo	Active	
56	048	Change Mgmt		Inability to temporarily backfill positions while associates are being trained could cause training schedule to be extened(inquiry, trainers implementation staff, attrition) est up to 100-150 positions.	Inability to temporarily backfill positions while associates are being trained could cause training schedule to be extened(inquiry, trainers implementation staff, attrition) est up to 100-150 positions.	Threat	4	3	\$ 300,000	12	0.98%	RED	MITIGATE - Work with Management, Union Leadership, and Staffing to develop a staffing plan to address iPower training needs.	Helen Vela	Active	
57	049	Device Mgmt		Potential loss of key personnel can cause delays in the project, misconfiguration of the system & incomplete processes	Potential loss of key personnel can cause delays in the project, misconfiguration of the system & incomplete processes	Threat	5	2	\$ 2,000,000	10	6.52%	YELLOW	MITIGATE - Confirm the potential loss of DM Team Lead, identify potential replacements, select and train replacement prior to the potential loss	Bob Jarvis	Active	
58	050	Device Mgmt		Barcode method - poor transition could cause delays and errors plus limit the funtionality	Barcode method - poor transition could cause delays and errors plus limit the funtionality	Threat	1	3	\$ 1,000,000	3	3.26%	GREEN	MITIGATE - Communicate impacts to the business. Ensure that adequate planning and preparation are performed by the business.	Bob Jarvis	Active	
59	051	Device Mgmt		Barcode method - good transition may provide significant increase in functionality	Barcode method - good transition may provide significant increase in functionality	Opportunity	5	3	\$ 1,000,000	15	3.26%	DARK BLUE	Capitalize on opportunities to streamline practices and procedures associated with data entry	Bob Jarvis	Active	
60	052	Device Mgmt		Data Cleansing needed; if not done properly could cause delays in schedule and bad data in new system	If data coming into the new system is not "clean" delays in getting the system ready for use could impact the schedule	Threat	1	1	\$ 2,000,000	1	6.52%	GREEN	MITIGATE - Coordinate data cleansing efforts with the data conversion team. Look for opportunities to enhance data validation.	Bob Jarvis	Active	
61	053	Device Mgmt		Delays in 3rd party software decisions may not give procurement enough time to meet schedule	Delays in 3rd party software decisions may not give procurement enough time to meet schedule thus impacting the project schedule	Threat	1	1	\$ 1,000,000	1	3.26%	GREEN	MITIGATE - Software was procured via Mark Barnabei. Installation Complete. Configuration is on-going.	Bob Jarvis	Closed	
	054	Service Mgmt	Internal	Performance & Testing	If the performance of the mobile infrastructure (M) and mobile systems Netweaver, MAM / MAU /	Threat	5	5	\$	1	25	0.00%	RED	MITIGATE - SAP is reviewing our information and will be advising on performance. (no change - 2/28/08)	Tony Fazio	Active

**Probability Key**  
 5 - Very High: 81%-99%  
 4 - High: 61%-80%  
 3 - Moderate: 41%-60%  
 2 - Low: 21%-40%  
 1 - Very Low: 1%-20%

**Impact Key**  
 5 - > \$3.5M; GE 1month  
 4 - \$1.76 to \$3.5M; 2 to 4 wk  
 3 - \$876K to \$1.75M; 1 to 2 wk  
 2 - \$500K to \$875K; 3d to 1wk  
 1 - < \$500K; < 3days

**Risk Status**  
 Green: 1-6  
 Yellow: 7-11  
 Red: 12-25

\*Please note, all shaded areas are calculated fields

# PI (Probability/Impact) Matrix

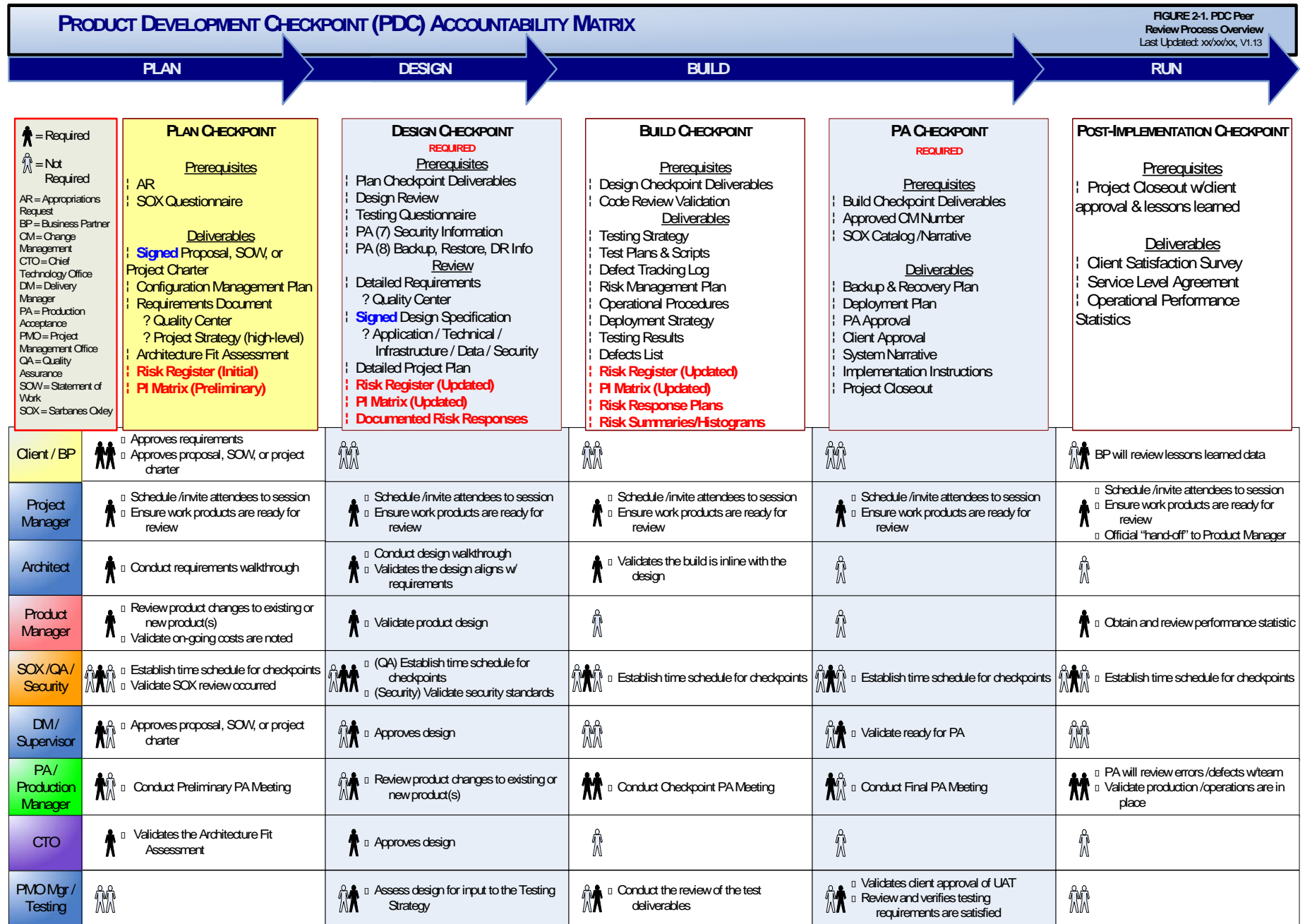
Score Probability		Threat					Opportunity					Score Probability	
Very High	5	5	30 10 49	15	20	54 25 20 21	25	20	51	10	5	5	Very High
High	4	31	36	18 12 25 48	16	20	20	16	37	8	4	4	High
Moderate	3	1 4 45 32 29	7 6 2	5 56 40 9 41	12	15	15	12	9	6	3	3	Moderate
Low	2	44	28 14 35 33	8 39 16 55 17 27 4 47	6 8 38	24	10	8	6	4	2	2	Low
Very Low	1	53 19 42 13 15 3 52	34 2 12	50	10	9 5 26	5	4	3	2	1	1	Very Low
	* Score Impact	1	2	3	4	5	5	4	3	2	1	* Score Impact	
		Very Low	Low	Moderate	High	Very High	Very High	High	Moderate	Low	Very Low		

Footnotes:

Threat: LT 8 = Green, 8 to 10 = Yellow, GT 10 = Red

Opportunity: LT 6 = Lt Light Blue, 6 to 10 = Mid Blue, GT 10 = Dark Blue







CUMO Matrix

	<b>Risk Register</b>	<b>PI Matrix</b>	<b>Risk Summary</b>	<b>Histogram</b>	<b>Risk Plan</b>
<b>Risk Planning</b>	<b>C</b>				
Introduce the program					
Identify Associate responsible for Project Risk					
Identify Roles & Responsibilities					
Determine Scales to be used					
Select Templates					
<b>Risk Identification</b>	<b>U</b>				
Brainstorming Session					
Identify Risk Owners					
<b>Risk Assessment</b>	<b>U</b>	<b>C</b>	<b>C</b>	<b>C</b>	
Identify Probability					
Identify Impact					
<b>Risk Analysis</b>	<b>U</b>	<b>U</b>	<b>U</b>	<b>U</b>	<b>C</b>
Identify Risk Responses					
<b>Risk Handling</b>	<b>U</b>	<b>U</b>	<b>U</b>	<b>U</b>	<b>U</b>
Update Risks					
Scheduled Reviews					
Status Reporting					

<b>Large</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>
<b>Medium</b>	<b>M</b>	<b>M</b>	<b>O</b>	<b>M</b>	<b>M</b>
<b>Small</b>	<b>M</b>	<b>O</b>	<b>O</b>	<b>O</b>	<b>M</b>

**LEGEND:**

- C**      **Create**
- U**      **Update**
- M**      **Mandatory**
- O**      **Optional**

