

Assignment

Subject: Risk and Disaster Management & Construction

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**Question 1) What is the difference between hazards and threats? Provide examples.**

**ANS)**

**Hazard:**

A hazard is defined as a condition in safety management that poses danger to your organization, and can lead to an accident, incident, or other mishap if not mitigated.

A hazard satisfies all of the following conditions:

- Is a dangerous condition, such as an object, situation, circumstance, that poses an unacceptable level of danger.
- Occurs once in the safety mishap lifecycle;
- Can lead directly to risk occurrence (i.e., safety mishap, accident, etc.) if not mitigated; and
- Arise from hazard mechanisms, such as initiating actions and hazardous sources.



Though it is sometimes confused with other things, such as below, a hazard is not:

- Benign objects (birds, mountains, people), which are hazardous sources;
- Safety mishaps, which are another way of saying risk occurrences;
- Damages, which are a product of risk occurrence; and
- Dangerous actions, which are associated with initiating mechanisms.

The only disagreement may be on what constitutes a “dangerous” situation. We advise you seek guidance from your compliance authority on this point.

**Examples:**

- Toxic chemicals and cleaning products
- Sharp objects in the waste
- Slippery Floor

- Blood on objects in the waste

### **Threat:**

A threat is defined as to describe danger, whether the danger has actualized or not. There are two types of threat.

- General threats: the amount danger in a given circumstance; and
- Specific threats: a specific object, situation, behavior, etc., that corresponds to a rising level of danger within a given context.

### **General Threat:**

One type of threat is a general threat, which refers to the amount of danger in a given circumstance. It is used in the context of “threat level,” such as:

- “There is no inherent threat in operations right now”; or
- “Given our current ERP, how much threat does a fire emergency pose?”
- Terrorism is a [specific] threat that poses great [general] threat to aviation

### **Specific Threat:**

A threat can also be a generic term for a specific danger, such as an object, situation, behavior, etc. A specific danger can be identified as:

- Contributing to rising danger – such as a hazardous source or contributing factor; or
- Representing actualized danger – such as a hazard occurrence.

### **Examples:**

- In spring time, migrating birds are a threat we have to mitigate
- That moose is no threat because he cannot get over the perimeter fence
- We have no plan for a bomb threat in our ERP

### **Difference between Hazard and Threat:**

Sometimes, hazard and threat might be used interchangeably. Consider the example of a flock of birds flying close to an aircraft. This flock is both a hazard and a threat.

However, because the concept of a threat is vaguer than the concept of a hazard, a threat is not always a hazard. Consider the example of:

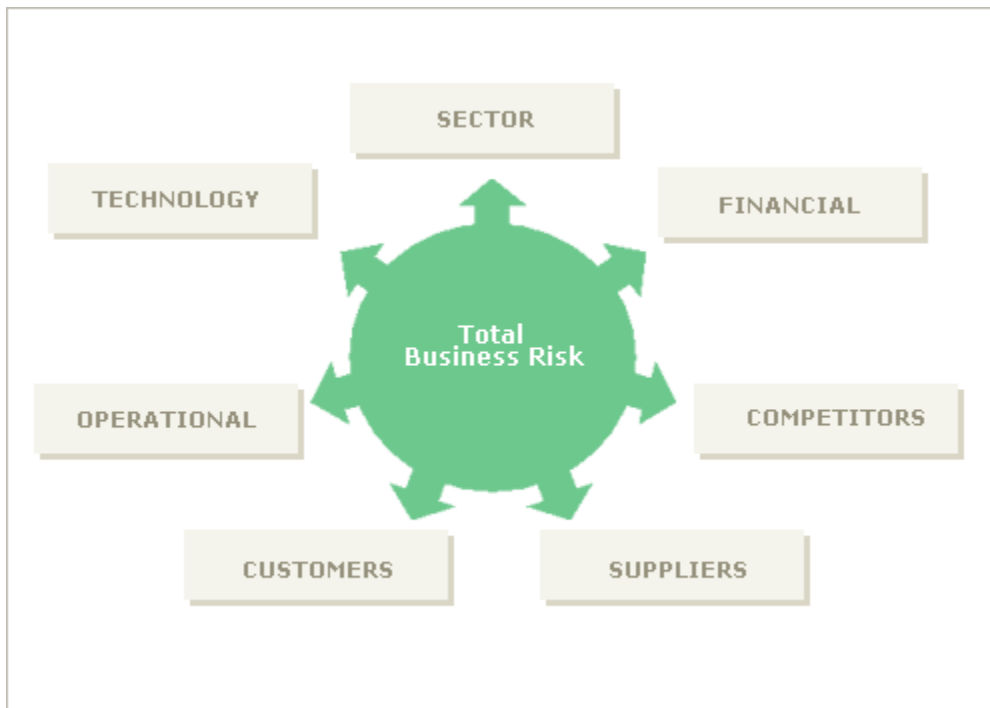
- migrating birds, which are a hazardous source but not an actual hazard, or
- Fatigue, which is a contributing factor.

**Question 2) Define risk and provide classification of risk based on its sources. Provide an example of each risk source.**

**ANS)**

**Definition:**

Risk maybe defined as a situation involving exposure to danger.



## **Classification of Risks:**

The purpose of the classification of risks is to show the risks identified in a structured manner, for example, in relation to their origin.

### **SECTOR:**

A risk that external factors independent from the entrepreneur's management could directly or indirectly influence the achievement of his or her objectives and strategies to a significant extent.

### **Examples:**

- Strong exposure to regulatory changes
- Business fragmentation
- Appearance of new markets

### **OPERATIONAL:**

The operational risks are associated with the entrepreneur's ability to convert the strategy chosen into specific plans, by means of an effective allocation of resources.

### **Examples:**

- Need for making an advertising effort
- High staffing costs
- Lack of operational and financial planning
- Tendency toward subcontracting. Tendency towards concentration

### **TECHNOLOGY:**

This measures the entrepreneur's exposure to the technological risks derived from the need to undertake heavy investment in order to ensure the feasibility of his or her business project within a specific period of time or the need for training the company's employees in the use of the technology.

### **Examples:**

- Significant investments
- Low level of implementation
- Low level of technological training

### **COMPETITORS:**

The size, the financial and operational capacity of the agents in a sector determine the degree of rivalry in that sector and set the rules of the game that any new agent has to consider in order to operate in the marketplace; this can involve risks for the entrepreneur.

#### **Examples:**

- Appearance of new competitors
- Intense competition
- Specialized competition

### **SUPPLIERS:**

The role played by the suppliers in the sector could generate risks for an entrepreneur due to variations in the price of raw materials, to the availability of a variety in the supply and for a continuous period of time, as well as the degree of concentration of the suppliers, which will determine the method of payment traditionally accepted in the sector.

#### **Examples:**

- Exposure to changes in the price of goods
- Dispersion in the supply
- Non-determination of the quality of the service provided
- Increase in power of negotiation

### **CUSTOMERS:**

The customer can be a crucial focal point of risk for an entrepreneur, since they are the generators of revenues; the risk can stem from changes in their tastes and needs, from generating pressures forcing prices down or from lengthening the payment period, among other factors, in such a way that the entrepreneur's value proposal must always be customer-oriented.

#### **Examples:**

- Increase in power of negotiation
- Lack of loyalty
- Social and demographic changes
- Seasonality and decline in the demand

### **FINANCIAL:**

The financial risks refer to the uncertainty associated with effective management and the control of finances carried out by the entrepreneur, as well as to the effects of external factors such as the availability of credit, exchange rates, movements in interest rates, etc.

### **Examples:**

- Long-term financial incapacity
- Exposure to interest rate changes
- Lack of knowledge of advantageous sources of financing, subsidies, etc.



**QUESTION 3) How would you assess the performance of transportation system of a city?**

**ANS)**

**Introduction**

Over the last few years, the public transport industry in many developing countries has been involved in a process of deep transformation. At present, personal mode usage is more than public transport mode, causes. Series of problems in daily life like, traffic congestion, delay, air pollution, noise pollution and large amount of energy wastage which has a negative impact on environment as well as on public health. Mobility requirements in metropolitan cities causes continuous growth of personalized vehicles leading to pollution and traffic congestion. To reduce the current pollution level, congestion and make the cities environment friendly, it is necessary to encourage the commuters to use the public transport system. To provide the desired service delivery level for public transport, it is essential to evaluate the existing transport systems using a reliable performance evaluation technique which can eventually help in enhancing the transit service delivery to their trusted passengers.

**Performance Evaluation**

Performance evaluation of public transport system requires to understand the terms on behalf of performance of the system to be evaluated. The evaluation can be done in two ways

- i) based on present perception of users about the service delivered
- ii) Based on the feedback provided by experienced evaluation team. Performance evaluation is defined as the technique to evaluate how well or bad is the performance of a transit service is under the prevailing operating condition.
- iii) The performance of transit system can be enumerated based on two distinct dimensions i.e., *Service* and *Service quality*. *Service* is described as “the business transaction that take place between a donor (Service provider) and Receiver (Customer) in order to produce an outcome that satisfies the customer” (Ramaswamy, 1996). Whereas, *Service quality* gives the measure of how well the service level delivered to the commuter’s as per

their expectation. Parasuraman (1988) and Gronroos, (1984) defines service quality as a comparison between customer expectation and perception of service

### Factors Affecting Service Quality

Estimation of service quality in terms of user perception is purely based on psychological behavior of the commuters. It is necessary to understand the key parameters upon which transit performance depends, as these factors internally and externally affect the user perception and creates a perception of the transit system in the user's mind. The selection of factors differs from one public mode to another. Various number of factors to define the service quality. The different service attribute dimensions are described in

Table 1.

Researcher's Name	Type of Transit System	Service Quality Attributes
Parasuraman et al.(1985)	Bus, Train, Metro	Reliability, Assurance, Tangibles, Empathy and Reliability
TRB USA (1999)	Buses, Tram, Metro and Rail	Reliability, Competence, Access, Courtesy, Communication, Credibility, Security, Understanding of customer and Tangibles.
Chang, Hepu and Yu-Hern (1999)	Bus transit system	Safety, Comfort, Convenience, Operation, Social duty (Vehicle air pollution level, Vehicle noise level)
Y. Tyrinopolus and Antoniou (2008)	Bus and Metro	Service frequency, Service hour, Time table info, Behavior of personnel , Distance and time to access and regress trip, Waiting condition at stop ,Driver behavior, Information in vehicle, Accessibility w.r.t Disabilities, Transfer distance, Transfer waiting time, Info regarding transfer
Margarita Friman (2009)	Buses	Frequency, Travel time, Punctuality, price, Information, Cleanliness, Bus comfort, Staff behavior, Seat availability, Bus stop security, Safety from accident, On board security, Bus stop condition and Info bus stop

Eboli and Mazzulla (2009)	Buses	Route characteristics, Service characteristics, Service reliability, Comfort, Cleanliness, Fare, Information, Safety and security, Personnel and Customer service
Sudin Bag and Som Sankar Sen (2012)	Metro	Air condition & lighting, Seating and free space, Inside atmosphere, Parking space, Smart card and multi ride facilities, Staff behavior, Management attitude, Helpfulness of staff, Attentiveness and resolve quarries,
Marta Rajo, Harnan, Luigi and Angel (2012)	Bus and Train transit system	Journey time, frequency, Condition of vehicle, Route , Number of intermediate stop, Bus stop location, Connection with other transport mode, Time table info, Possibility of buying ticket at home, Journey distance, Cost of journey, Number of delay bus and train services, Average speed of journey,
Adris.A.Putra (2013)	Bus Transit System	Safety, Accessibility, Affordable Tariff, Capacity, Regularity, Swift and fast, On time, Integration, Efficent, Easyness, Orderly, Security, Cozy, Low Pollution,

### **Method of collecting user perception data**

Surveys and interviews are the most popular methods of primary data collection. The User perception data can be collected by conducting a Station/Stop Survey or Workplace survey by direct face to face interview or by using alternative (telephonic interviews) indirect techniques. Paper-and-Pencil Interview (PAPI) is very popular for data collection, in which an enumerator asks questions to the respondent by holding a printed set of questions.

### **Performance Evaluation Models**

Major works on “performance evaluation” began after 1970, many of the transportation planners and researchers had started trying different approaches and techniques for developing different models to estimate the transit system

performance in terms of user perception. Since service quality is a qualitative parameter hence modeling of qualitative parameters creates more difficulties.

### **SERVQUAL Model**

Parasuraman (1985) suggested a model for measuring service quality by measuring the gap between the service delivered and service received. It is mostly used by market researchers to identify customer satisfaction on behalf of service delivered. This model represents the service quality in terms of 10 dimensions namely, Reliability, Responsiveness, Competence, Access, Courtesy, Communication, Credibility, Security, understandability and Tangibles. But after 1988, these ten components were merged to formulate five distinct dimensions namely, Reliability, Assurance, Tangibles, Empathy, Responsiveness. These components are collectively called RATER. However, limitation of this model is SERVICE QUALITY (SERVQUAL) factors are inconsistent and it is not incomprehensible for different applications.

### **Impact Score Technique (IST)**

Federal Administration of the U.S (1999) developed a simple and effective measurement method to evaluate customer satisfaction for transit services termed as Impact Score Technique. The IST approach determines the relative impact of attributes on user satisfaction by measuring relative decrease in user satisfaction when there is a problem with the attributes. For each attribute the whole sample is divided into two categories, user who faced a recent problem and those who haven't faced any problem (within past 30 days). The gap between mean overall ratings of two groups is known as "Gap Score". A composite index is found out by multiplying gap score to problem incident rate.

### **Important Performance Analysis (IPA)**

IPA was first introduced by Martilla (1977). IPA is also known as quadrant analysis which is used in many areas due to its ease of identification of different quality parameter that can lead to the improvement in Service quality.

#### **Question 4) Define security vulnerabilities of a university campus?**

**ANS)**

##### **SECURITY VULNERABILITIES OF A UNIVERSITY CAMPUS:**

Sometimes it seems like the security challenges facing American colleges and Universities are never-ending. Students and others share user information. Campus visitors pop USB sticks into networked machines. Hackers find their way into an internal network through carelessly discarded information from an open screen or from an infected workstation. Here are six of the things that keep campus security people up at night, and big challenges that schools should address to make themselves more resistant to cyber threats.

##### **Phishing and Social Engineering Attacks:**

One of the biggest challenges with university cybersecurity is the sheer amount of hacking that goes on in these environments. Schools have to deal with a unique mix of user levels, including students who are often young, and relatively trusting, and are not employees of the organization so they're less controlled.

For example, research shows a full 90% of malware attacks originate through e-mail. Various types of spoofing and spear-phishing campaigns entice students and others to click on illegitimate links that can usher in a Trojan horse to do damage to a network system, or compromise the security of information. Many of these kinds of phishing are cost, high — which leads to an inundation of hacker activity that schools have to keep in top of, by somehow segmenting network systems, by shutting down compromise parts of the system, or by some other high-tech means. With this in mind, better security often starts with identifying separate pools of users — for example, administrative staff versus faculty and students, and then customizing controls and access for each of these groups individually.

##### **The IT Crunch: Limited Resources**

The challenge of limited resources and funding for university cybersecurity generally speaks for itself. The above kinds of network monitoring and cybersecurity engineering have significant costs attached to them, and many universities simply find it difficult allocate the manpower or the funding to address cybersecurity issues.

## **Regulatory Burdens and Secure Data Efforts**

Another part of this challenging cybersecurity environment is that schools and universities have big compliance burdens under many different types of applicable regulation. Some campus leaders tend to focus on items like NIST 800-171 and the use of controlled unclassified information, just because there is a deadline on for this particular type of compliance right now. However, regulations like FERPA are also critical. Even HIPAA puts pressure on schools to tighten up cybersecurity, since as healthcare providers, schools may hold student health data. Third-party cloud providers often offer FEDRAMP certification and other qualifications for cybersecurity on their side of the fence — but that doesn't fully bring a university into compliance unless it can bring its own internal systems up to standards.

## **System Malware**

Universities and colleges also have to anticipate situations where hackers may exploit existing system vulnerabilities. They have to look at continuing support for operating systems and other technologies. There is a reasonable expectation that manufacturers will make adequate security available, but this doesn't absolve the University of having to look for security loopholes and close them. This means evaluating architectures for example, can hackers get host names, IP addresses and other information from devices like printers? It also means using multi-factor authentication to control user activity. It means understanding how malware will enter a system, and anticipating attacks. The good news is that modern security tools go well beyond the perimeter of a network to seek out harmful activity if they are set up right and controlled and observed well, they can dramatically decrease risk.

## **Protecting Personally Identifiable Information**

At the heart of many of these cybersecurity efforts is the daunting struggle to protect all sorts of personally identifiable information, from simple student identifiers to financial data and medical data, from grades to Social Security numbers and items that identity thieves might use. The above-mentioned regulations are part of the drive to secure this type of data, along with more general standards and best practices for enterprise. Simply put, data breaches cost money, both in damage control, and in the reputation of the school itself.

In some ways, this ongoing data vigilance is hard for schools, because the academic world isn't necessarily into strict control of information. But it's also hard in a

practical sense, because so many cybersecurity architectures just can't handle modern challenges, like a WannaCry infiltration or other attacks that exploit common vulnerabilities. Many schools have up to a dozen or more security tools in place, but many of these tools don't talk to each other or share data well, and so they become less effective as a comprehensive protective force. There are some things that schools can do to protect PII — one technique is to limit end-user storage and access — for instance, restricting the ability of students to simply move floods of information to the cloud, or navigate sensitive internal network areas freely. Another strategy is to use internal monitoring tools to inspect network traffic for suspicious activity. For example, peaking at the header and footer of data packets can show the origin of data transfers, unless there is spoofing or some sophisticated type of deception involved. Some schools will go further and fully decrypt data packets to see what's inside them. However, this practice can involve getting into the philosophy of privacy, where schools are wary of digging into network traffic because they see their monitoring as too intrusive to students or other users. In addition, emerging European privacy standards may put some pressure on schools in the U.S. to limit decryption and observation activities.

### **End-User Awareness and Training**

Another way for schools to increase safety is for them to conduct vibrant types of end-user awareness campaigns.

This starts with educating end-users on how malware gets into a system asking them not to click on suspicious e-mails or use inbound links, but instead to always do online banking and perform other transactions through a secure website. Schools can also educate on the kinds of data that are most likely the targets of hacking activity — research data, student grades, health information or other sensitive data sets that hackers really want to get their hands on.

On the other side of the equation, schools should also work on improving their internal security postures — figuring out how they will respond to attacks, and how they will preemptively safeguard systems against everything from phishing to ransomware.

The End