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Question (1) Define and explain the risk log/register in your own words. Develop a risk log/register for the construction project (you have worked in or you are working). Details of each project must be unique and should be provided accurately to the best of your knowledge. Risk register is attached at the end of the paper (Table 1). Use notes for specifying headings

Answer) Risk Register (or Risk Log) is a document that contains all the results of risk analysis and where risk response plans are recorded.” The results of other risk management processes eventually also end up in Risk Register. You fill it in during the planning phase.

Moreover, a good practice is to share the register and lessons learned about risks as a part of the project archive.

So keep in mind that you contribute to the organization’s knowledge base. Moreover, to your future projects as well.

Risk Register Template

Again this is just a starting point for you.

As always suggest you create a custom risk register template yourself.

As the register is quite simple in structure and contents.

Nevertheless, it is one of the artifacts that require constant attention and maintenance.

It provides you with the information necessary to make quality decisions on response plans. Also, you will be able to focus on the most severe risk and spend your risk management budget wisely.

Keep in mind that risk management does not come for free.

Risk Register Template is the part of my Full Resource Guide on Risk Management.

The Risk Register contents

- Jump to the Risk Register Template
- Risk ID - a unique identifier for the risk
- Date raised - the date the risk was identified
- Risk description - best written as 'There is a risk that xxxxx, because of xxxx if this occurs it will xxxx'
- Likelihood - How likely is that the risk will occur. Can be 1- 5 or High / Medium / Low
- Impact - What will the impact be if the risk occurs. Severity - Likelihood x Impact
- Owner - The person who will be responsible for managing the risk.
- Mitigating action - Actions that can be taken to reduce the likelihood of the risk occurring. May also be acceptance of the risk or transference of the risk e.g. insurance.
- Risk Mitigation techniques.
- Contingent action - What will be done if this risk does occur. Usually actions to reduce the impact on the project
- Progress on actions - A regular update on progress of the mitigating actions
- Status - For example Open, Waiting, Closed, in Progress etc.

RISK LOG REGISTER

Column Heading	Peshawar BRT
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Risk #	<ol style="list-style-type: none"> 1) Technical complexity 2) Dangerous substances and items 3) Inadequate sites management 4) Corrosion
Date Opened	29/October/2017
Risk OPI	<p>Different departments or consultant are responsible for these implementations. Peshawar development authority (PDA) is responsible for all the implementations and execution.</p>
Risk Description	<ol style="list-style-type: none"> 1) Once a project passes from the feasibility stage to the design stage, the decision-maker, amongst other things, must have assessed the implications of the various risks. When traditional materials or methods are used in construction, the familiarity of those involved with the design or the work itself may permit an occasional ambiguity in the drawings or specifications without them being misinterpreted. It may even provide correction of a mistake. However, in a new design, material or construction method, what is needed is precise and thorough communication between the designer, manufacturer or contractor, as the case may be, and others involved in the construction process. 2) It is stated that poor substances low quality material is used during construction of BRT Peshawar. According to

following statement: The ADB stopped the provincial government from making future payments to contractors because of the poor quality of work. The ADB loan will not be disbursed further until the provincial government introduces changes in the design to address “critical” deficiencies. The inferior quality construction could damage the projects reputation at the international level, warned the lender that had approved a \$335 million (Rs53 billion) loan for the project in mid-2017.

- 3) The corrosion seems to be an all-pervasive phenomenon causing widespread destruction of all types of structures in all countries across the world and has come to be termed as Cancer for concrete. According to ADB the bodies of the buses are made of non-corrosive material. Similarly, the body is made up of a material which is durable enough to handle direct sunlight. The source believes that there is a risk of corrosive material that is used in BRT buses so there is a risk of corrosion.
- 4) Inadequate site management in BRT Peshawar has held several times. Traffic system in the city totally mess with thousands of motorists suffering due to poor management of BRT site work. Traffic congestion on the road of KP of Peshawar getting worse day by day, considering the statement of an assistant engineer. “The contractor has not yet submitted any schedule for the completion of BRT project nor has progress report been submitted to any concern department.

Risk Category	Application, Project Management Process.
Probability	<p>25% chances of technical complexity because of already developed and populated areas.</p> <p>30% chances of using dangerous material because it is mostly underground or on supports in the form of flyovers.</p> <p>As the Peshawar area is already developed and well populated so we have to face the problems of inadequate sites management because site require an area from where we can easily transport the material to the working sites.</p> <p>Corrosion is an another issue because the structure is open to the environmental effects such as thunder storming, acid rain etc.</p>
Impact	Medium
Risk Treatment Strategy	Management have to take action of the above mentioned risks because it is dangerous to areas where there is population and business centers.
Priority	Medium
Risk Management Plan	<p>Plans should be made according to the requirements so the structure should not fail because of the above mentioned risks.</p> <p>Materials should be of high quality, sites should be managed</p>

	according to the station location.
Risk Status	<p>Sites risks are managed well and properly.</p> <p>Material problems still exist have to managed well and properly by repairs and overlaying.</p> <p>Technical complexity still exists in plans because of poor design. With the time being changes are made to the plans according to the already existed populated areas and business centers.</p>
Issue #	Above mentioned risks are realized on the very early stages of project and changes are made with the time to time of execution of the specific issue.
Lessons Learned	<p>Yes we have learned alot from the bus rapid transaction project Peshawar.</p> <p>Before heading on to the plans and executing the project a survey is necessary to know about the views of common citizen that how they should be effected by such project that changes are to be made on the very early stages and we don't have to face such difficulties.</p>

Question 2) Discuss how Cost-benefit analysis is effective for a project? Support your arguments with real example.

Ans) Definition of 'Cost Benefit Analysis

A procedure for estimating all costs involved and possible profits to be derived from a business opportunity or proposal

Description: It takes into account both quantitative and qualitative factors for analysis of the value for money for a particular project or investment opportunity. Benefits to costs ratio and other indicators are used to conduct such analyses

The objective is to ascertain the soundness of any investment opportunity and provide a basis for making comparisons with other such proposals. All positives and negatives of the project are first quantified in monetary terms and then adjusted for their time-value to obtain correct estimates for conduct of cost-benefit analysis. Most economists also account for opportunity costs of the investment in the project to get the costs involved..

Cost-benefit analysis (CBA) is a technique used to compare the total costs of a programme/project with its benefits, using a common metric (most commonly monetary units). This enables the calculation of the net cost or benefit associated with the programme.

As a technique, it is used most often at the start of a programme or project when different options or courses of action are being appraised and compared, as an option for choosing the best approach. It can also be used, however, to evaluate the overall impact of a programme in quantifiable and monetised terms.

CBA adds up the total costs of a programme or activity and compares it against its total benefits. The technique assumes that a monetary value can be placed on all the costs and benefits of a programme, including tangible and intangible returns to other people and organisations in addition to those immediately impacted. As such, a major advantage of cost-benefit analysis lies in forcing people to explicitly and systematically consider the various factors which should influence strategic choice.

Decisions are made through CBA by comparing the net present value (NPV) of the programme or project's costs with the net present value of its benefits. Decisions are based on whether there is a net benefit or cost to the approach, i.e. total benefits less total costs. Costs and benefits that occur in the future have less weight attached to them in a cost-benefit analysis. To account for this, it is necessary to 'discount' or reduce the value of future costs or benefits to place them on a par with costs and benefits incurred today. The 'discount rate' will vary depending on the sector or industry, but public sector activity generally uses a discount rate of 5-6%. The sum of the discounted benefits of an option minus the sum of the discounted costs, all discounted to the same base date, is the 'net present value' of the option.

EXAMPLE

'Good Health' is a startup hospital that has been in operation for close to two years now. The manager, however, plans to expand its operations in the third working year. The hospital management decides to run a cost-benefit analysis to determine whether or not the decision is beneficial or feasible.

The management analyzes a time horizon of one year and estimates that the total revenue collected will amount to 500,000. However, this will be possible if 2 more physicians are hired and more hospital equipment worth 200,000 bought. The salary of the physicians will be 90,000, and the cost of hiring and training will be 8,000.

Therefore, when calculating the CBA, we first get the total costs by adding all the costs.

In this case, it will be salaries + equipment+ cost of hiring and training
= 200,000+ 90,000+ 8,000
= 298,000

Additionally, there is the cost of expanding consultation rooms which

stands at \$10,000.

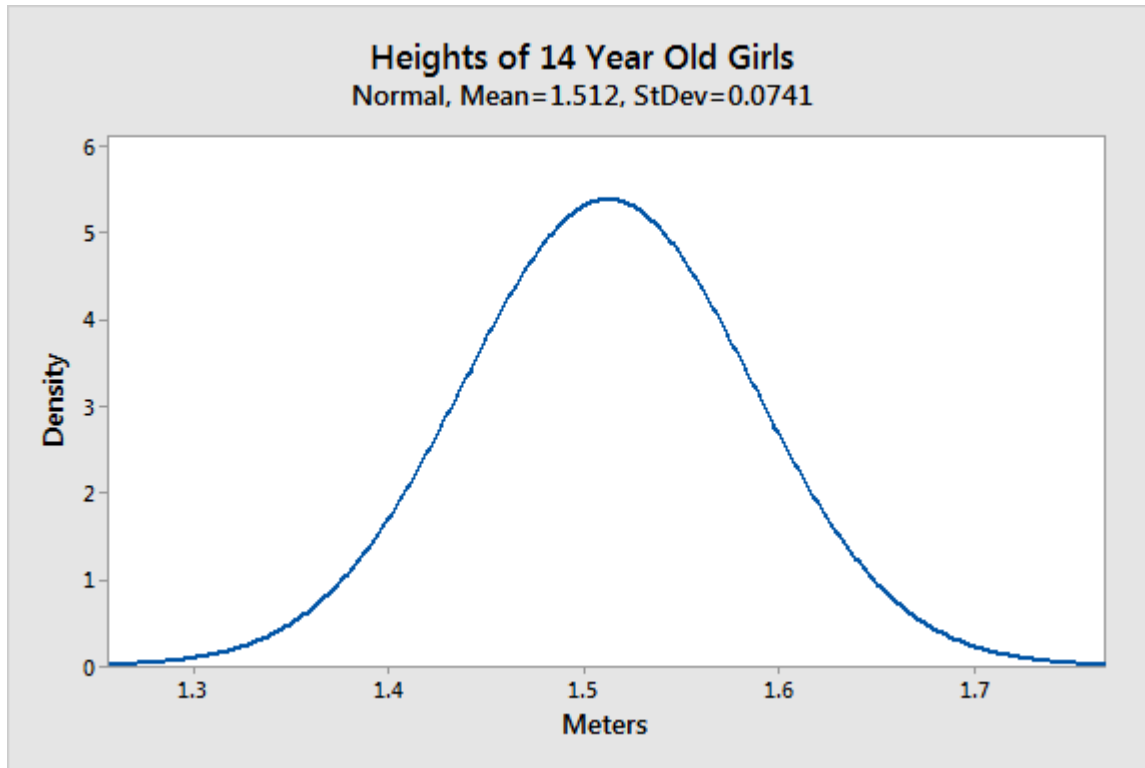
On the other hand, the benefits that will come after the implementation of the plan will be 500,000. Therefore, using the benefit-cost ratio, we get $298,000/500,000 = 0.596$. Given that the value is positive and that the total benefits are greater than the costs, the CBA indicates that the decision to expand the hospital's operation is feasible and beneficial to the company.

Question 3 (a) what is Normal Probability distribution?

Ans) The normal distribution is a probability function that describes how the values of a variable are distributed. It is a symmetric distribution where most of the observations cluster around the central peak and the probabilities for values further away from the mean taper off equally in both directions. Extreme values in both tails of the distribution are similarly unlikely. The normal distribution is a probability function that describes how the values of a variable are distributed. It is a symmetric distribution where most of the observations cluster around the central peak and the probabilities for values further away from the mean taper off equally in both directions. Extreme values in both tails of the distribution are similarly unlikely.

Example of Normally Distributed Data:

Height data are normally distributed. The distribution in this example fits real data that I collected from 14-year-old girls during a study.



As you can see, the distribution of heights follows the typical pattern for all normal distributions. Most girls are close to the average (1.512 meters). Small differences between an individual's height and the mean occur more frequently than substantial deviations from the mean. The standard deviation is 0.0741m, which indicates the typical distance that individual girls tend to fall from mean height.

The distribution is symmetric. The number of girls shorter than average equals the number of girls taller than average. In both tails of the distribution, extremely short girls occur as infrequently as extremely tall girls.

Question 3(b) Suppose that the data concerning the first-year salaries of employees is normally distributed with the population mean $\mu = 60000$ PKR and the population standard deviation $\sigma = 15000$ PKR. Find the probability of a randomly selected employees earning less than 45000 PKR annually. Hint: To answer this question, you have to find the portion

of the area under the normal curve from 45 all the way to the left. Find Z-Score table at the end of the paper (Table 2).

NOTE: I have solved the above question by hand and in soft form also so I am uploading both of them in pictorial form as well as in soft too.

Q.3 (b)

Given data:-

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Sol:-

We draw normal curve sketch showing x and z values and the desired area

Under the curve with

$$\mu = 60,000 \text{ --- (1)}$$

$$\sigma = 15,000 \text{ --- (2)}$$

$$x = 45,000 \text{ --- (3)}$$

As we have

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{45,000 - 60,000}{15,000}$$

$$z = \frac{-15,000}{15,000}$$

$$z = -1.$$

Therefore using the following z table, we have

$$P(x < 45) = P(z < -1)$$

The value 0.15866 See the Column

Data

mean $\mu = 60000$ PKR-----1

standard deviation Given data :

$\sigma = 15000$ PKR-----2

$x \leq 45,000$ -----3

Required:

The portion of the area under the normal curve from 45 all the way to the left?

Z-Score table at the end of the paper (Table 2)?

-3.8	.0000 7	.0000 7	.0000 7	.0000 6	.0000 6	.0000 6	.0000 6	.0000 5	.0000 5	.0000 5
-3.7	.0001 1	.0001 0	.0001 0	.0001 0	.0000 9	.0000 9	.0000 8	.0000 8	.0000 8	.0000 8
-3.6	.0001 6	.0001 5	.0001 5	.0001 4	.0001 4	.0001 3	.0001 3	.0001 2	.0001 2	.0001 1
-3.5	.0002 3	.0002 2	.0002 2	.0002 1	.0002 0	.0001 9	.0001 9	.0001 8	.0001 7	.0001 7
-3.4	.0003 4	.0003 2	.0003 1	.0003 0	.0002 9	.0002 8	.0002 7	.0002 6	.0002 5	.0002 4
-3.3	.0004 3	.0004 7	.0004 5	.0004 3	.0004 2	.0004 0	.0003 9	.0003 8	.0003 6	.0003 5
-3.2	.0006 9	.0006 6	.0006 4	.0006 2	.0006 0	.0005 8	.0005 6	.0005 4	.0005 2	.0005 0
-3.1	.0009 7	.0009 4	.0009 0	.0008 7	.0008 4	.0008 2	.0007 9	.0007 6	.0007 4	.0007 1
-3.0	.0013 5	.0013 1	.0012 6	.0012 2	.0011 8	.0011 4	.0011 1	.0010 7	.0010 4	.0010 0
-2.9	.0018 7	.0018 1	.0017 5	.0016 9	.0016 4	.0015 9	.0015 4	.0014 9	.0014 4	.0013 9
-2.8	.0025 5	.0024 8	.0024 0	.0023 3	.0022 6	.0021 9	.0021 2	.0020 5	.0019 9	.0019 3
-2.7	.0034 7	.0033 6	.0032 6	.0031 7	.0030 7	.0029 8	.0028 9	.0028 0	.0027 2	.0026 4
-2.6	.0046 5	.0045 3	.0044 0	.0042 7	.0041 5	.0040 2	.0039 1	.0037 9	.0036 8	.0035 7
-2.5	.0062 1	.0060 4	.0058 7	.0057 0	.0055 4	.0053 9	.0052 3	.0050 8	.0049 4	.0048 0
-2.4	.0082 0	.0079 8	.0077 6	.0075 5	.0073 4	.0071 4	.0069 5	.0067 6	.0065 7	.0063 9
-2.3	.0097 2	.0104 4	.0101 7	.0099 0	.0096 4	.0093 9	.0091 4	.0088 9	.0086 6	.0084 2
-2.2	.0139 0	.0135 5	.0132 1	.0128 7	.0125 5	.0122 2	.0119 1	.0116 0	.0113 0	.0110 1
-2.1	.0178 5	.0174 3	.0170 0	.0165 9	.0161 8	.0157 8	.0153 9	.0150 0	.0146 3	.0142 6
-2.0	.0227 5	.0222 2	.0216 9	.0211 8	.0206 8	.0201 8	.0197 0	.0192 3	.0187 6	.0183 1
-1.9	.0287 2	.0280 7	.0274 3	.0268 0	.0261 9	.0255 9	.0250 0	.0244 2	.0238 5	.0233 0
-1.8	.0359 3	.0351 5	.0343 8	.0336 2	.0328 8	.0321 6	.0314 4	.0307 4	.0300 5	.0293 8
-1.7	.0445 7	.0436 3	.0427 2	.0418 2	.0409 3	.0400 6	.0392 0	.0383 6	.0375 4	.0367 3
-1.6	.0548 0	.0537 0	.0526 2	.0515 5	.0505 0	.0494 7	.0484 6	.0474 6	.0464 8	.0455 1
-1.5	.0668 1	.0655 2	.0642 6	.0630 1	.0617 8	.0605 7	.0593 8	.0582 1	.0570 5	.0559 2
-1.4	.0807 6	.0792 7	.0778 0	.0763 6	.0749 3	.0735 3	.0721 5	.0707 8	.0694 4	.0681 1
-1.3	.0968 0	.0951 0	.0934 2	.0917 6	.0901 2	.0885 1	.0869 1	.0853 4	.0837 9	.0822 6
-1.2	.1150 7	.1131 4	.1112 3	.1093 5	.1074 9	.1056 5	.1038 3	.1020 4	.1002 7	.0985 3

-1.1	.1356 7	.1335 0	.1313 6	.1292 4	.1271 4	.1250 7	.1230 2	.1210 0	.1190 0	.1170 2
-1.0	.1586 6	.1562 5	.1538 6	.1515 1	.1491 7	.1468 6	.1445 7	.1423 1	.1400 7	.1378 6
-0.9	.1840 6	.1814 1	.1787 9	.1761 9	.1736 1	.1710 6	.1685 3	.1660 2	.1635 4	.1610 9
-0.8	.2118 6	.2089 7	.2061 1	.2032 7	.2004 5	.1976 6	.1948 9	.1921 5	.1894 3	.1867 3
-0.7	.2419 6	.2388 5	.2357 6	.2327 0	.2296 5	.2266 3	.2236 3	.2206 5	.2177 0	.2147 6
-0.6	.2742 5	.2709 3	.2676 3	.2643 5	.2610 9	.2578 5	.2546 3	.2514 3	.2482 5	.2451 0
-0.5	.3085 4	.3050 3	.3015 3	.2980 6	.2946 0	.2911 6	.2877 4	.2843 4	.2809 6	.2776 0
-0.4	.3445 8	.3409 0	.3372 4	.3336 0	.3299 7	.3263 6	.3227 6	.3191 8	.3156 1	.3120 7
-0.3	.3820 9	.3782 8	.3744 8	.3707 0	.3669 3	.3631 7	.3594 2	.3556 9	.3519 7	.3482 7
-0.2	.4207 4	.4168 3	.4129 4	.4090 5	.4051 7	.4012 9	.3974 3	.3935 8	.3897 4	.3859 1
-0.1	.4601 7	.4562 0	.4522 4	.4482 8	.4443 3	.4403 8	.4364 4	.4325 1	.4285 8	.4246 5

