Actuarial Modelling Assignment

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1) Steps taken in development of the said model:

i. Objectives to be set – Sufficient capital to be held so that there is less than 0.5% chance of liabilities exceeding assets.

ii. Planning the modelling process – Taking all cases such as inflation and depreciation to estimate the lowest value of the assets in every scenario.

iii. Collect Data – Data of all the Present value of Assets and Liabilities should be collected. Also, future inflation data to be collected.

iv. Define the Parameters – Various parameters such as inflation, depreciation, technology obsolescence, Creditor defaults and much more to be defined.

v. Involve Experts – Finance experts should be involved to get the range taken for the defined parameters and to know the correlation within them.

vi. Run the model – After running the model and getting the distribution of output we can get to know as to how much capital is to be maintained so that there is less than 0.5% chance of liabilities exceeding assets.

2) The following factors could cause the probability to be inaccurate:

   i. Multiple independent runs have to be carried in a stochastic model an each run only gives an estimate of the output. Thus, if outputs are based of only a single run, then this could be a factor.

   ii. Models rely heavily on inputs. So, estimating wrong inputs are taking wrong ranges of inputs could also be a factor.

   iii. All future events cannot be determined in a model. So, any uncertain event not taken in the model could also be another factor.

3) Stages in identifying an appropriate model:

   i. As mortality as various parameters and range of them deterministic would not go here. Hence, stochastic model has to be used.

   ii. Various parameters have to applied such as healthcare infrastructure, Standard of living etc.

   iii. Also, the past data of the mortality has to be taken.

4) Key items to be included I the documentation are:

   i. Model should not be treated as a 'black box', and it should not be assumed that all results are valid without considering the appropriateness of using that model for the data input and the output expected.

   ii. It is not possible to include all future events in a model. A significant change might render the model obsolete.

   iii. Models rely heavily on the data input. If the data quality is poor or lacks credibility, then the output from the model is likely to be flawed. Thus, before checking the output of the model, inputs must be verified.

5)

Advantages:

i. Could be done easily with low cost.
ii. Time Saving.
iii. No expert's involvement needed.

Disadvantages:

i. Any uncertain event such as a Pandemic could hamper the whole model.
ii. The food taste can change in the upcoming generation and thus they could not like the Scrummy Bar.
iii. Also, the people getting the habit of the bar could stick on to the product irrespective of their age.

6) Possible reasons why the results are different are:

i. The student who made the model may not have done Reproducibility.
ii. Reproducibility refers to the idea that when the results of a statistical analysis are reported, sufficient information is provided so that an independent third party can repeat the analysis and arrive at the same results.
iii. Without Reproducibility, the new student may not have understood the parameters taken and might have altered the model.

7) The appropriateness of the modelling approach depends on the following:

i. As new town is planned migration could play a larger role here thus, instead of only going with the current age distribution and population some data on migration should also be collected.
ii. Current population distribution will not work here as in the town cost of living would increase and thus senior citizens would like to move back to their villages hampering the population distribution.
iii. Students studying abroad should also be taken into consideration which will allow to reduce the size of the schools needed.

8) The factors that the company should take into consideration are as follows:

i. Central Tendencies of the age of the employees should be taken into consideration.
ii. Average age of hiring of new people should be taken into consideration. More young recruits should be hired to decrease the sickness level.
iii. Inflation. Medical inflation which is the highest level of inflation should also be considered as it will help to better estimate the future financial pay outs.