Series 6

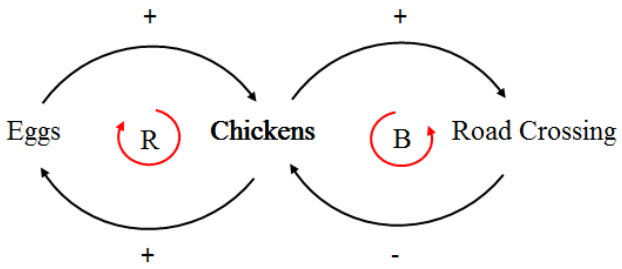
1) In the following there are examples given for a business problem which has to be solved. Write for each example down, a) which method(s) you would select and use or test to each other, b) which software tool(s) you probably would use, c) the two most important qualities of the model you are expecting and d) how you would test the goodness of fit or performance of the model:
   i) A retailer wants to launch some special offer and is sending out advertisements to the existing customers. The retailer wants to know among all existing customers which are responding to that given offer.
   ii) A service company is building up a new help line service for their customers. The company wants to know, how much a given customer will use that new service.
   iii) A consumer goods producing company wants to restructure their sales teams and is thinking about how to organise the different sales teams.
   iv) A manufacturing company wants to improve the efficiency of its production line in one of its plants.
   v) A trader wants to analyse if messages on social media platforms like e.g. twitter have an influence on the price of Novartis shares.

2) System Dynamics: feedback and causal loop diagram for planning infrastructure: in today's world there are a lot of traffic jam and congestion. One solution is typically building more roads and increasing the capacity.

   i) Thus, draw a feedback and causal loop diagram for this system when one has the following elements: "Road construction", "Highway capacity", "Traffic volume", "Travel time", "Desired travel time" and "Pressure to reduce congestion".
   (Hint: there is one closed loop and 2 open loops)
   ii) Note the direction of causation "+" and "-" at each arrow and if the closed loop is self-reinforcing (R) or balancing (B).

3) System Dynamics:

   In the lecture we have seen the feedback and causal loop diagram of the dynamics of the eggs and chicken and the chicken and road crossing. Both diagrams can be combined for representing one system:



   Thus, draw the corresponding stock and flow diagram for this system.
   (Hint: there are 2 stocks, the Eggs and the Chicken, and 3 valves, the "egg laying rate", the "hatching rate" and the "run over rate".