“Uncertainty is a state of doubt about the future or about what is the right thing to do.” [[1]](#footnote-1)

“a situation in which something is not known, or something that is not known or certain”[[2]](#footnote-2)

Marketing: “Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.” [[3]](#footnote-3)

What can be uncertain in marketing?

* What the agents influence
* Basically everything
* Participating in the market, demand is a central topic, driven by
  + Own and others’ product quality, what is driven by suppliers as well
  + Economic situation of society
  + Success of own and competitive campaigns
  + Technical advancements of competitive products
  + Geographical region
  + Supplied quantity of a good, connected its price
* Hard to give a complete picture, too complex
* The less uncertainty, the better and better decisions can be made
* Resolve this problem by
  + Using models to get an idea of what could happen, different in different situations
  + Understand and quantify this uncertainty
  + Identifying the sources of uncertainty
* CLV context: Models in general are incomplete representations of the reality, they are never achieving a correct result, uncertainty in the forecasts
* 2 parts: “Outside” of the model and from the modeling part

### Types of uncertainty

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 14PI | 20 | 24 | 16 | 9 | 12 | 23 | 27 | 1 | 28 | 29 | 30 | 31 | 32 |
| Customer behavior / model extern |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Campaigns of competitors |  | x |  |  |  |  |  |  |  |  |  |  |  |  |
| Marketing contacts |  |  |  | x |  |  |  |  |  |  |  |  |  |  |
| State of the economy |  |  |  | x |  |  |  |  |  |  |  |  |  |  |
| Customer retention or churn (not observable) |  | x | x |  |  |  |  |  |  |  |  | x[[4]](#footnote-4) | x1 | X1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Model (related) errors (named as such) / model intern | x |  |  |  | x | x |  |  |  |  |  |  |  |  |
| Parameter estimation errors | x |  |  |  | x |  | x | x |  | x |  |  |  |  |
| Wrong form of the point  forecasting model | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Random variations in data  generating process | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Data uncertainty |  |  |  |  | x | x |  |  |  |  | x |  |  |  |
| Epistemic and aleatory uncertainty |  |  |  |  |  | x |  |  |  |  |  |  |  |  |

In the following, the most important points are discussed in more detail, starting with customer behavior. As the whole CLV calculation attempts to model customer behavior, it is self-explaining that uncertainty is based here. Influences found in the literature that increase the uncertainty of customer behavior and hence the CLV do so because they are not considered in the model. Examples are campaigns of competitors, marketing contacts in the past, presence and future and state of the economy in a sense that people change their consumption behavior between recession and boom times. What is also a dominant issue that creates uncertainty is the possibility of a customer leaving the company forever either to switch to a competitor or stop consuming. The problem here is that the probability of being “alive” is included in the model but still, most customers won’t notify the company when they churn, so it stays a mere probability. Considering a customer still alive who churned quickly at the very beginning may obviously lead to overestimation of the CLV and vice versa, hence uncertainty. The second part considers uncertainty that comes from inside the model. It is to note that the papers quoted here are not necessarily concerned with CLV estimation but treat forecasting models in general or in other contexts, often time series or wind forecasting. Nevertheless, since the model concerned here suffers from similar issues as other forecasting models, these aspects are relevant here as well. Especially often addressed is the fact that a model based on parameters needs its parameters to be estimated first which is connected to some amount of uncertainty. This issue will be addressed in this work as well in the following part. Also often mentioned is data uncertainty that might not be a problem here as the process how these data are obtained and treated before the model is employed is not too complex. Nevertheless, problems as mentioned in (29), i.e. inconsistencies in data integration from various sources (e.g. different branches), any data corruption in the process or the employment privacy policies. The latter can become an issue when mistakes are made while anonymizing the records of single customers.

1. https://www.collinsdictionary.com/de/worterbuch/englisch/uncertainty#google\_vignette [↑](#footnote-ref-1)
2. https://dictionary.cambridge.org/dictionary/english/uncertainty [↑](#footnote-ref-2)
3. https://www.ama.org/the-definition-of-marketing-what-is-marketing/ [↑](#footnote-ref-3)
4. Even though those papers do not state explicitly that churn contributes to uncertainty in the CLV estimation, they do make the connection from churn to CLV estimation (20, p. 2) [↑](#footnote-ref-4)