



Modeling the innovative potential of companies in the pharmaceutical industry

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- Innovation in times of health crises – why it matters?



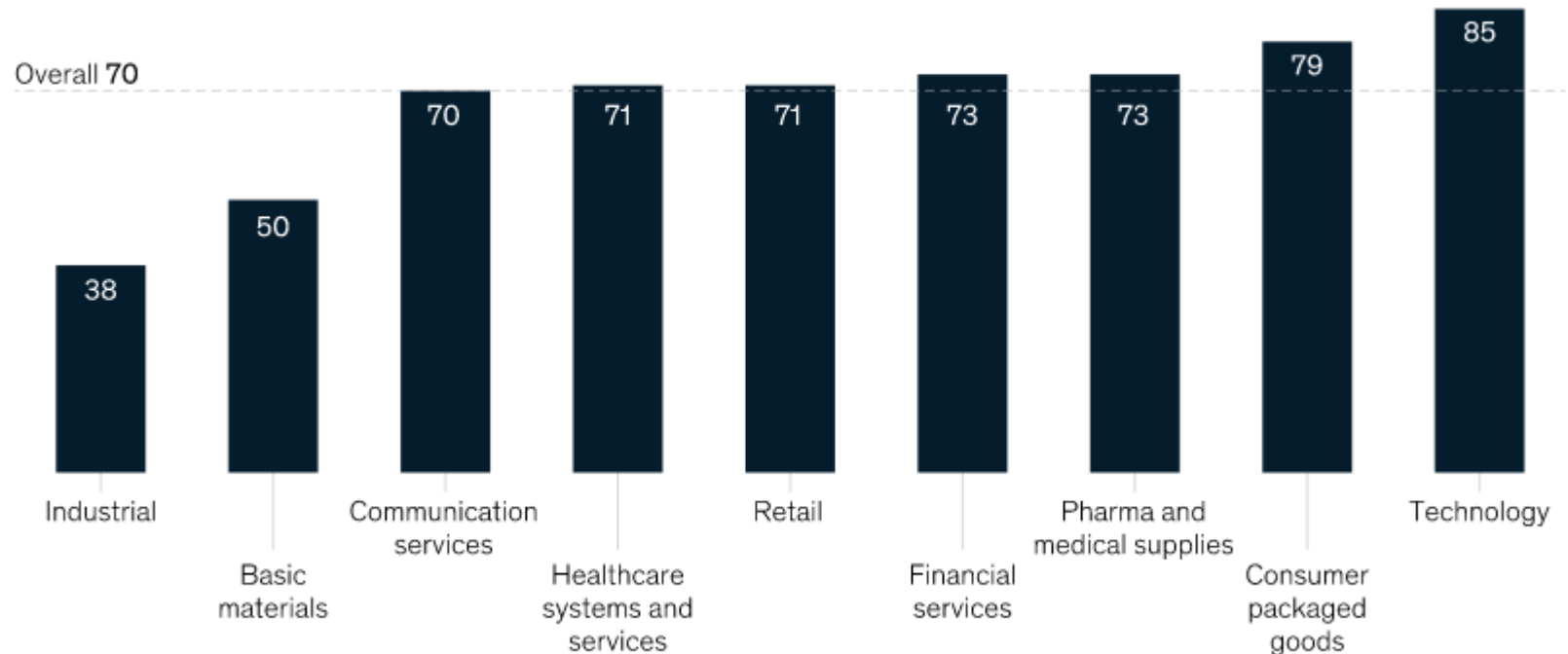
- Can we estimate the potential and assess the benefits?



This matter is serious....

- What is the expected impact of COVID-19 crisis on the market?

Share of executives who expect the COVID-19 crisis to be 1 of the biggest opportunities for growth in their industry, %

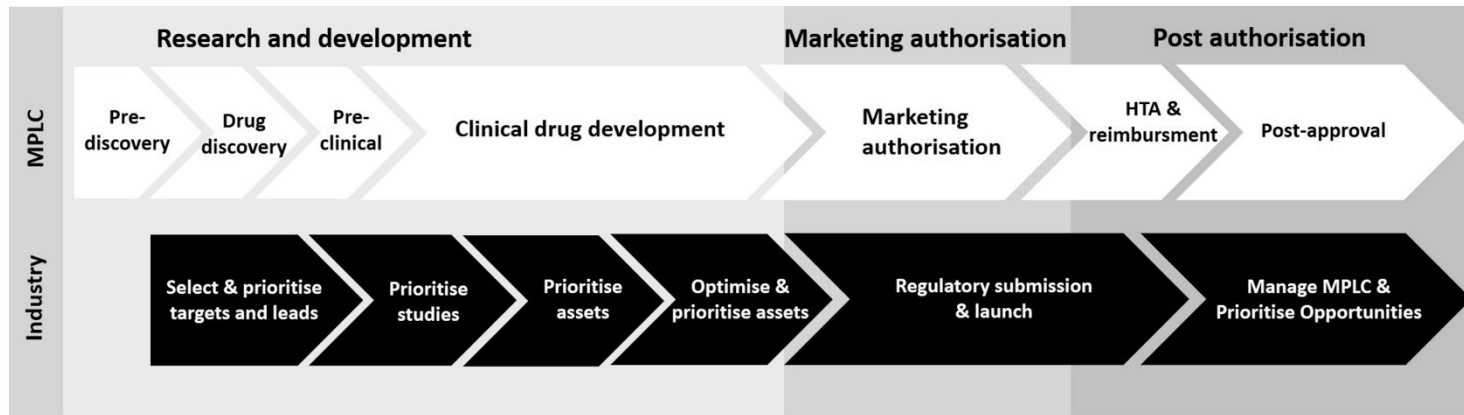


Source: McKinsey Innovation through Crisis Survey, April 2020



Standard ways do not apply...

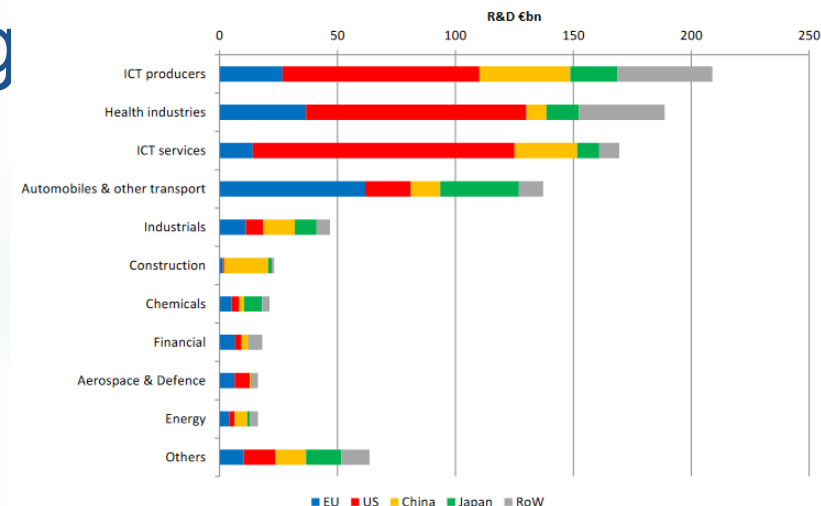
■ The decision making process



Source: Whichello, C.; Bywall, K.; Mauer, J. et al., An overview of critical decision-points in the medical product lifecycle: Where to include patient preference information in the decision-making process?, Health Policy, Volume 124, Issue 12, 2020, <https://doi.org/10.1016/j.healthpol.2020.07.007>

■ The costs and financing

Healthcare and pharmaceuticals are consistently one of the top-spenders with regard to R&D.

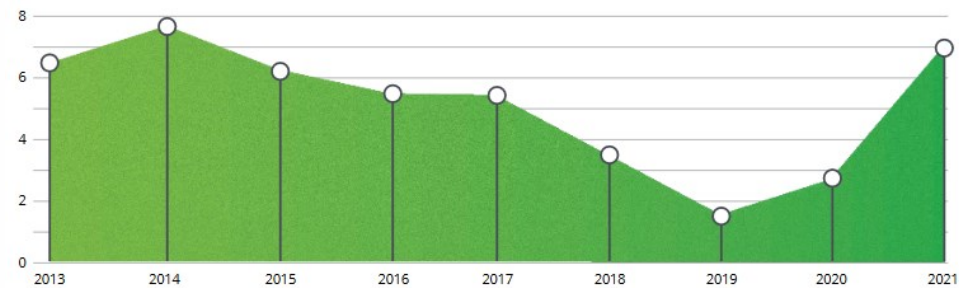


Source: The 2021 EU industrial R&D investment scoreboard



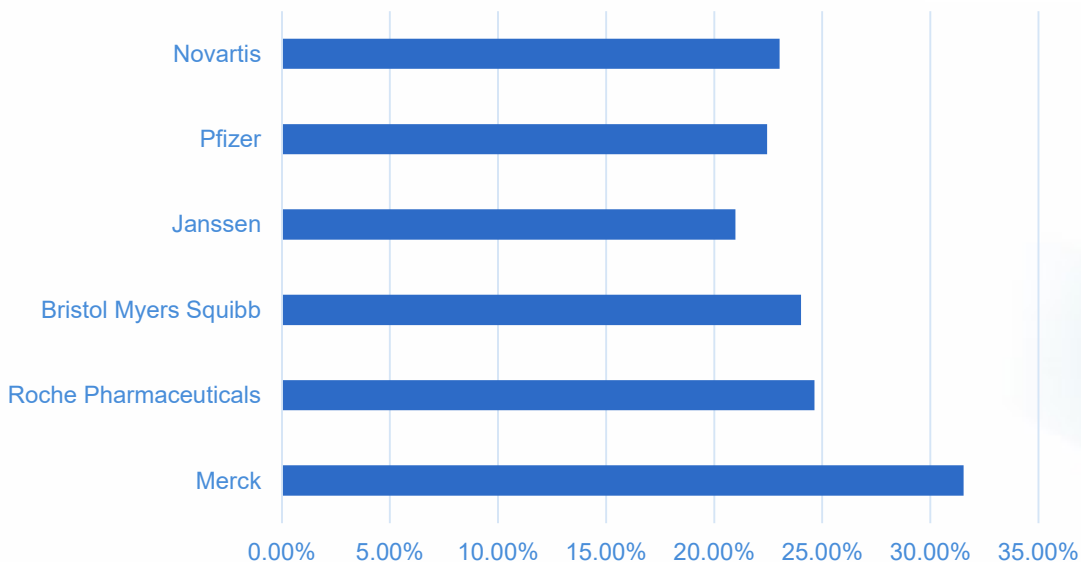
Rules of collaboration...

- How high can R&D cost can be?
 - Some estimates suggest between 160M to 4.6B USD [1]



Source: Nurturing growth, Measuring the return from pharmaceutical innovation 2021, Deloitte Centre for Health Solutions UK, January 2022.

R&D costs to sales (2020)

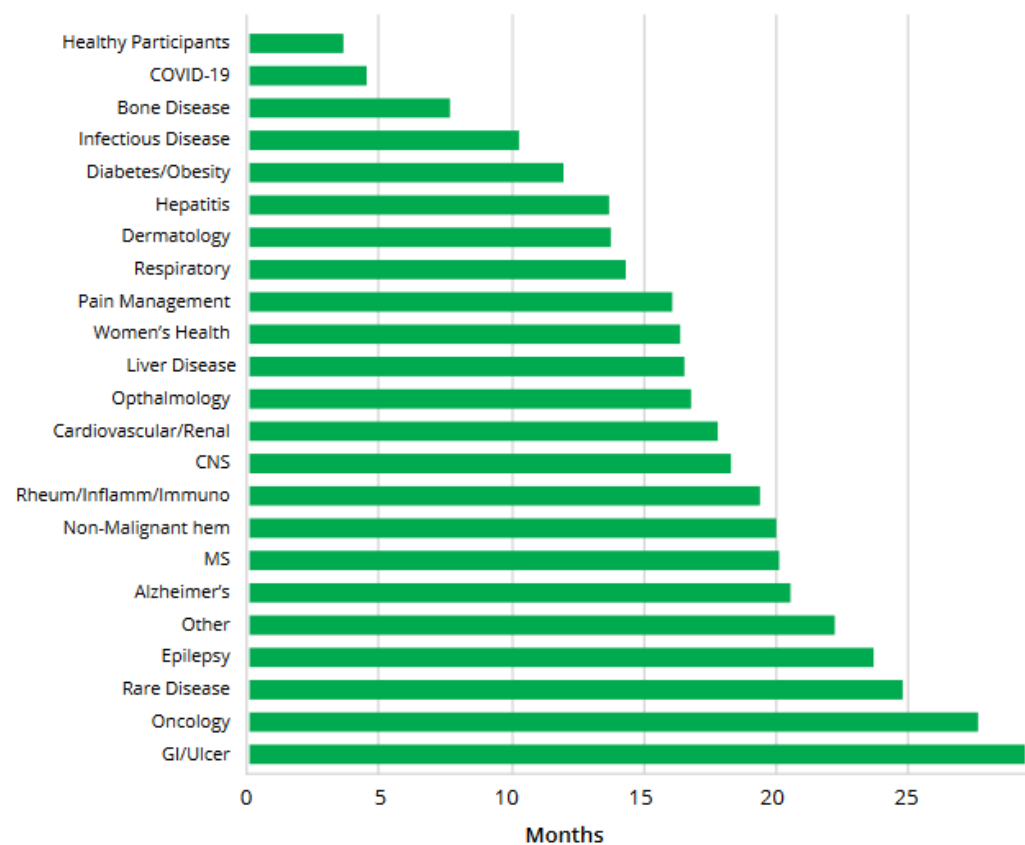
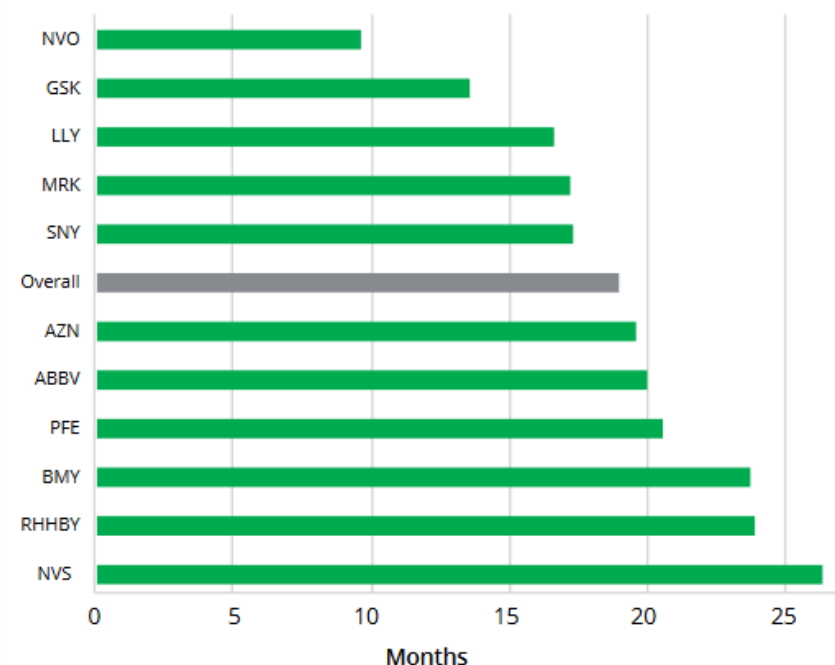




Time pressure...

■ Pandemics impact on timelines

Weighted average enrollment time in months by company (left) and by therapeutic area (right)





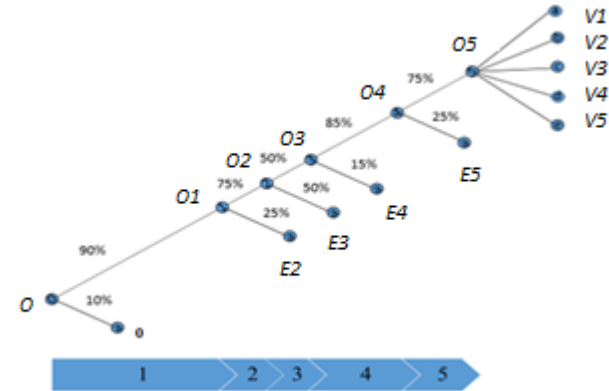
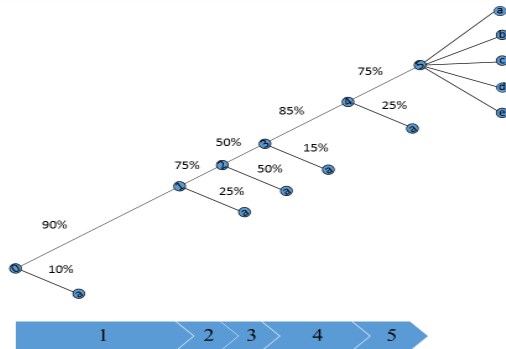
What do we suggest?

- An extended real options analysis approach
 - Stage-oriented assessment and Monte Carlo analysis of inputs – as in [1].
 - With the following extensions:
 - Application of jump-diffusion in modelling inputs.
 - Estimation of more than one value – simulation of different stages and paths of development.
 - Assessment of collaboration and boosting factors that can influence the whole process.

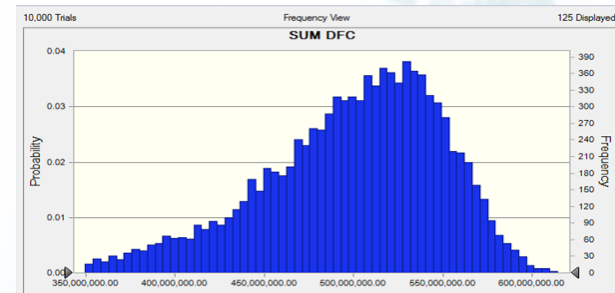


Stage-oriented approach...

■ Stage-oriented decision making and assessment



Risk assessment



Monte Carlo simulation in order to estimate inputs.

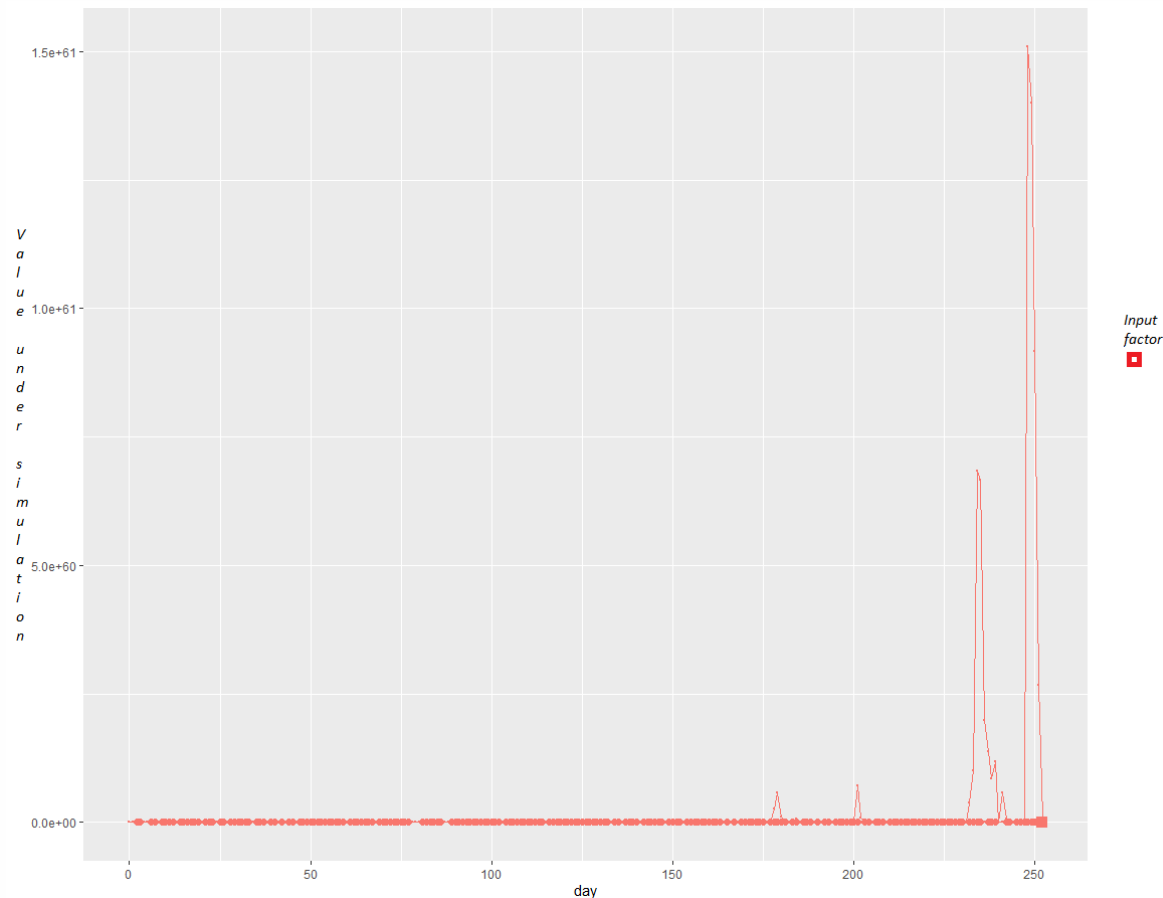


Jumps in input assessments....

■ The “special” behavior in times of crisis

“Jumps” in observed inputs:

- Sales
- R&D costs (investments)
- Delay times
 - Supply chain issues





Multiple scenarios and collaboration

- Multiple scenarios = better risk assessment?





In fine...

THANK YOU FOR YOUR ATTENTION!



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