Project Slides

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2021-04-09

R Markdown

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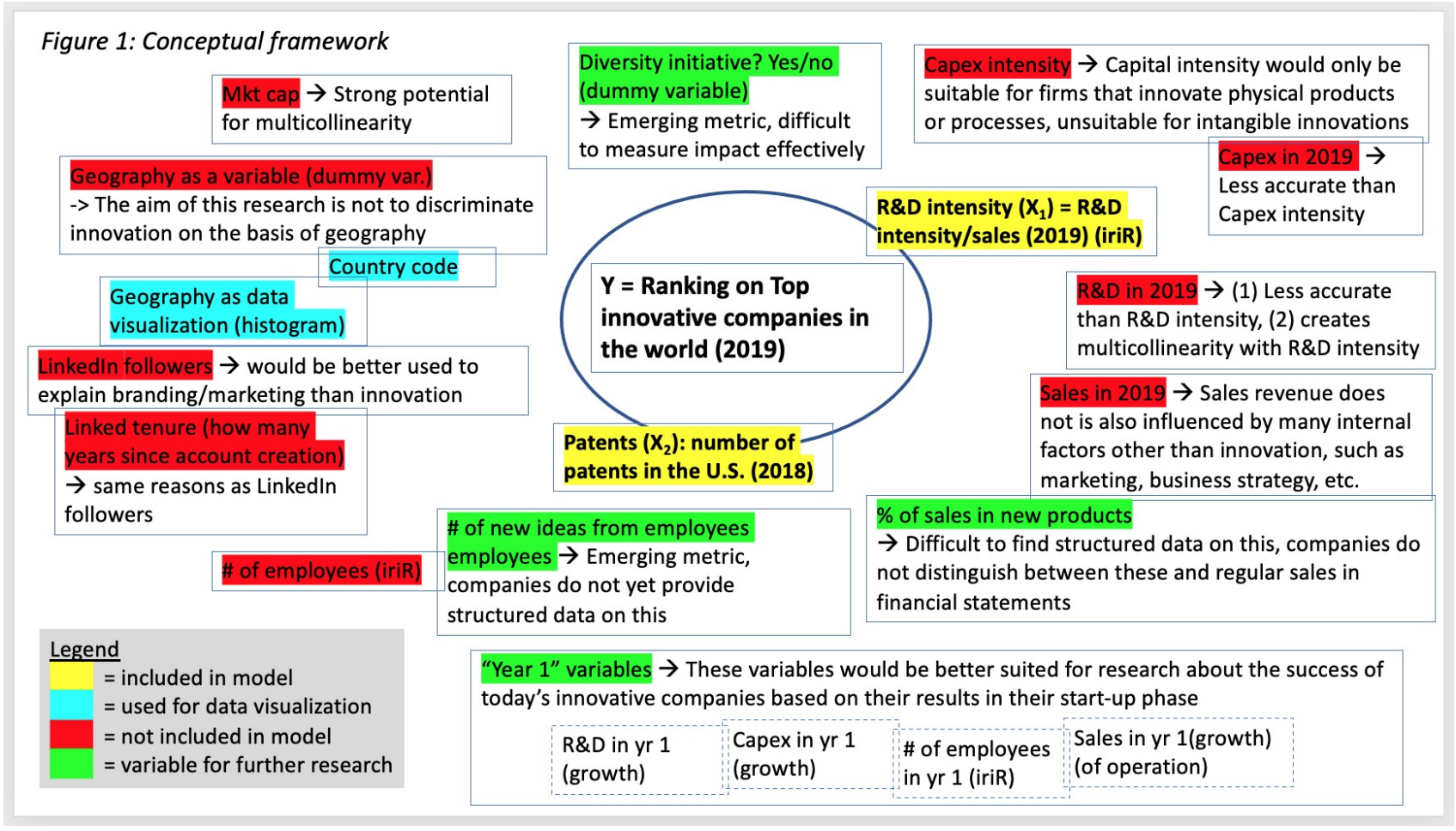
Conceptual Map



Research Question

"What is the Impact of number of patents granted in the U.S. and R&D intensity on the ranking of the Top 30 innovative companies"

Data Collection and processing

Models

- In an ordinal logistical regression, the output is the **Odds** of the a giving possible outcome as demonstrate in the following formula:

$$logit(P(Y < i)) = \beta_0 - \beta_1.x_1 - \beta_2.x_2 - \beta_3.x_3 - \epsilon$$

- final_filtered_data <- final_filtered_data %>% mutate(indicator = case_when(indicator == "top 10" ~ 2, indicator == "top 20" ~ 1, TRUE ~ 0))

Models

- Model 1: $logit(P(indicator)) = \beta_0 - \beta_1.RD - \beta_2.patent$
- Model 2: $logit(P(indicator)) = \beta_0 - \beta_1.(RD)^2 - \beta_2.patents$
- Model 3: $logit(P(indicator)) = \beta_0 - \beta_1.RD - \beta_2.(patents)^2$
- Model 4: $logit(P(indicator)) =$
  $\beta_0 - \beta_1.RD - \beta_2.patents - \beta_3.(RD.patents)$

R result

	Dependent Variables:			
	Indicator			
	Model 1	Model 2	Model 3	Model 4
RD_intensity	-0.05697	-0.05697	-0.05697	-0.069308
Patent_2018	0.72495	0.72495	0.72495	0.63663
RD_intensity . Patent_2018				0.007523
Intercept:				
0|1	-0.2799	-0.2799	-0.2799	-0.4325
1|2	1.167	1.167	1.167	1.0157
Observation	30	30	30	30
Residual Deviance	59.8637	59.8637	59.8637	59.85396
AIC	67.8937	67.8937	67.8937	69.85396

Interpretation

Since model 1,2 & 3, AIC score is lower than model 4's (**67.8637** $<$ **69.85396**), therefore any of the first 3 model can be consider as the "best" model

With this knowledge, the following statements can be made:

- For every one unit increase in R&D intensity, the odds of being in the upper rank (top 10 or top 20 versus top 30) is multiplied **0.06** (1-0.94)times, holding constant all other variables.
- For every one unit increase in patent, the odds of being in the upper rank (top 10 or top 20 versus top 30) is multiplied **2.06** times, holding constant all other variables.

Slide with Plot