ST841 Group 7
Tax Analytics and Automation

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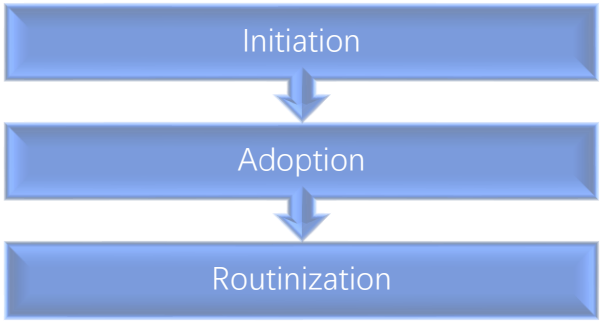
What factors are related to the three-stage diffusion of tax analytics and automation (TAA) technologies in corporate tax departments?

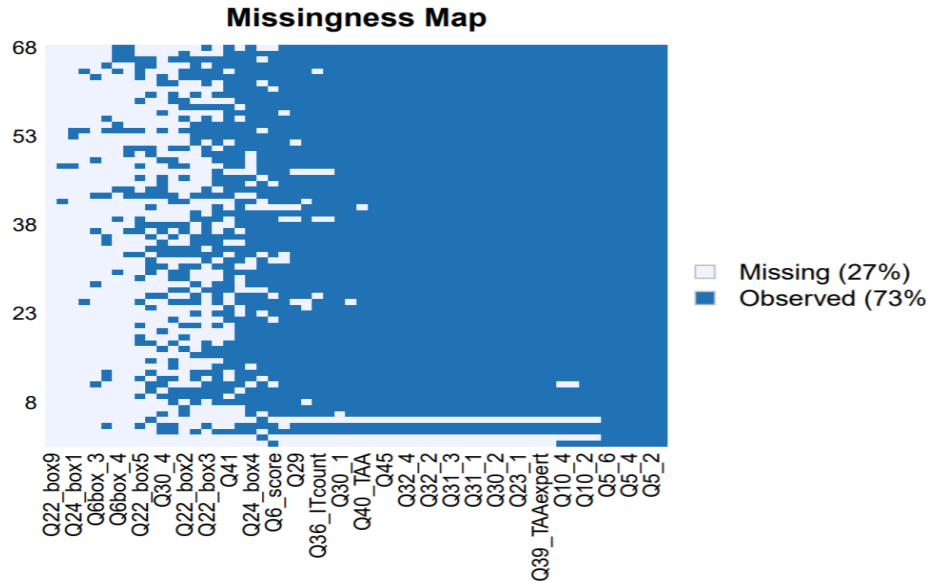


Seven Factors

- Technology Readiness
- Technology Integration
- Firm Size
- Global Scope
- Managerial Obstacle
- Competition Intensity
- Regulatory Environment

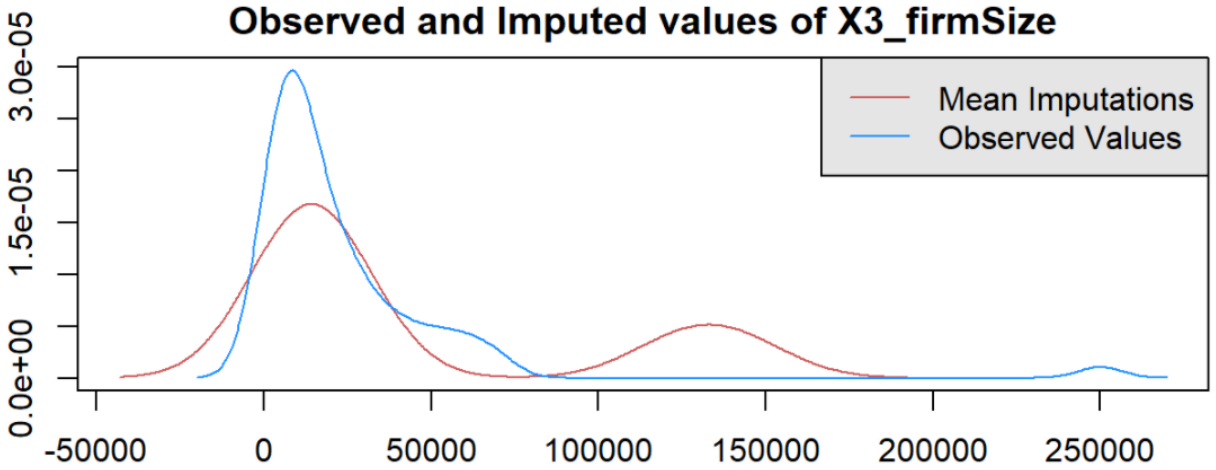
Survey Design

- The client design a survey with 23 questions selected for analysis to quantify the ten variables.
- 65 valid responses are collected from the Fortune 1000 companies.
- Two problems:
  - Missing value imputation.
  - Combine Likert Items.



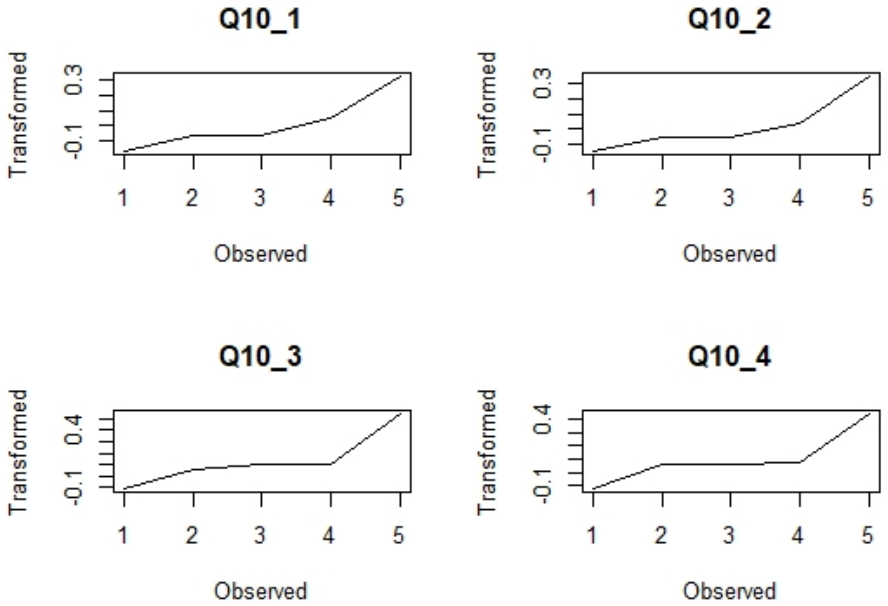
Missing Value Imputation

- Amelia
  - EM Algorithm
  - Multivariate regression
  - Assumption
- Discrete Likert scale still need to be taken care

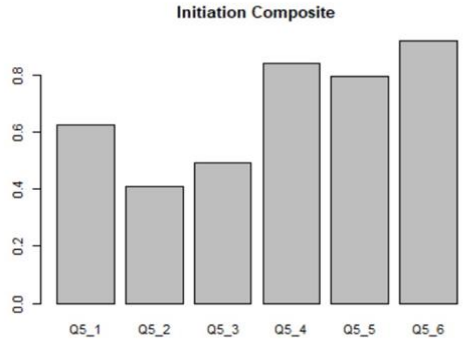


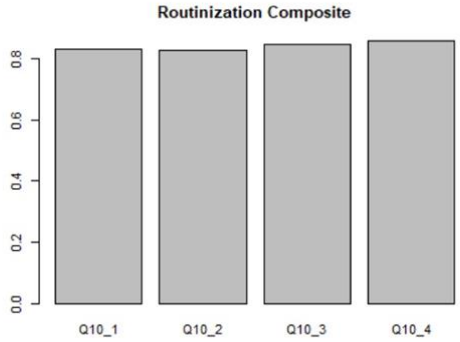
Likert Variable Transformation

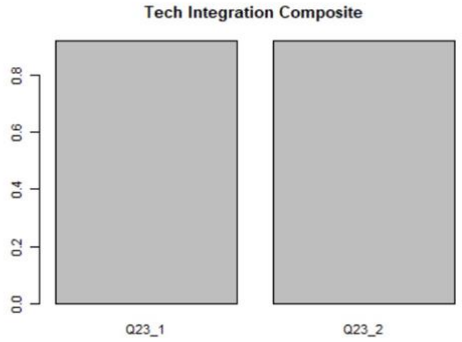
- 2 response variables and 4 explanatory variables are measured using a collection of Likert scale questions.
- We combine the Likert scale data for each variable into a single continuous measure, which can be done using non-linear principal components analysis.
- The technique works by optimally transforming the Likert data to a continuous scale and then performing regular PCA on the transformed data.

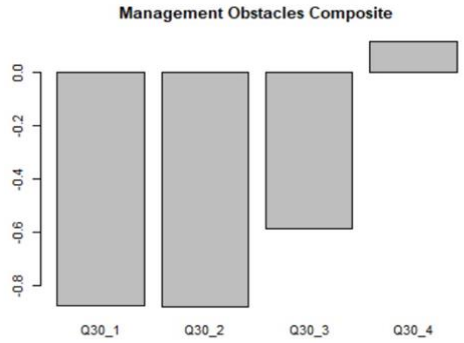


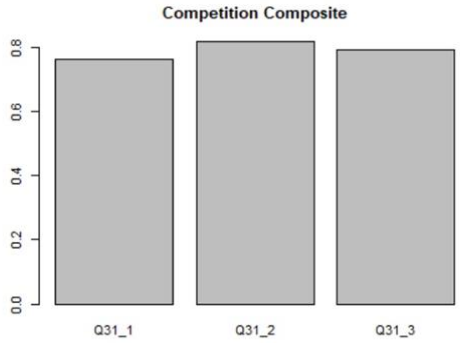
Loadings of Likert Transformation

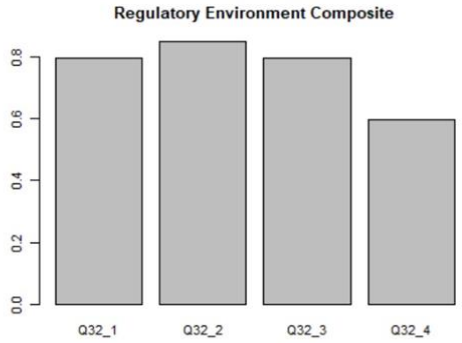












MANOVA Result

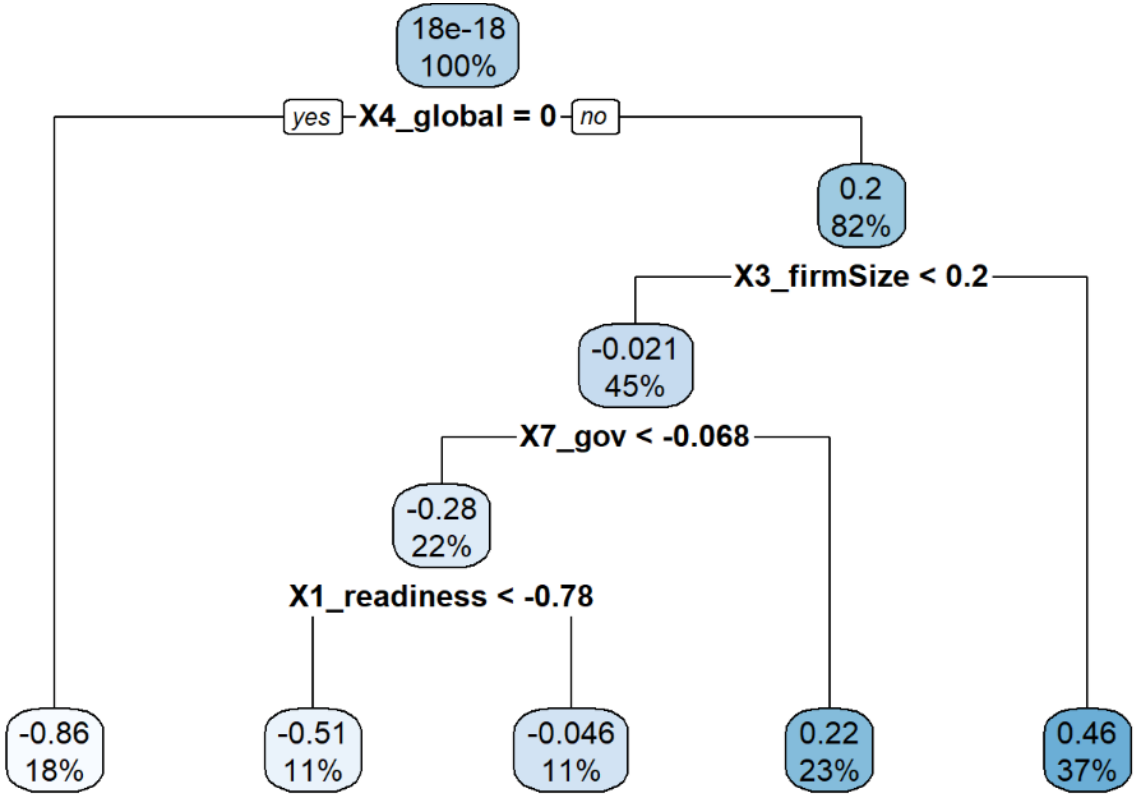
	Wilk	Pillai	Hotelling/Roy	F-statistic	p-value
Technology Readiness	0.73	0.28	0.38	7.47	0.0003***
Technology Integration	0.86	0.14	0.16	3.10	0.03*
Firm Size	0.90	0.10	0.11	2.07	0.11
Global Scope	0.86	0.14	0.17	3.29	0.03*
Management Obstacles	0.91	0.09	0.10	1.96	0.13
Competition Intensity	0.98	0.02	0.03	0.50	0.68
Regulatory Environment	0.97	0.03	0.03	0.54	0.65

Table 2: MAONVA test statistics and their p values. *** means $p < 0.001$, ** means $p < 0.01$ and $*$ means $p < 0.05$.

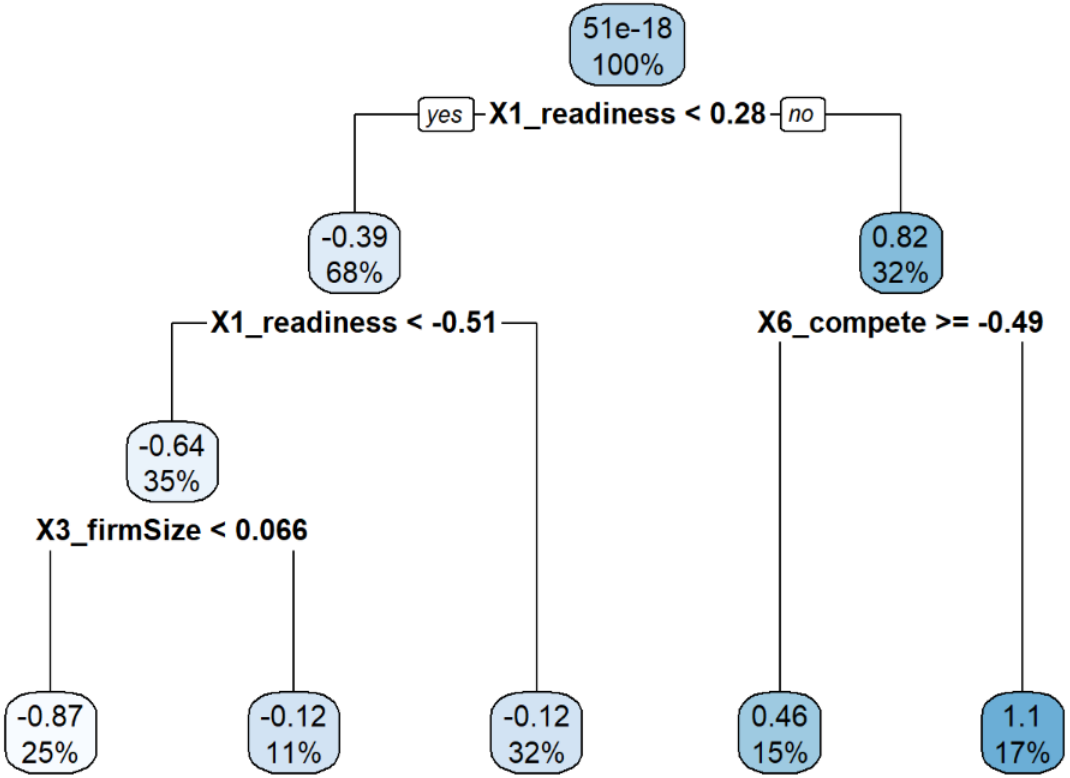
Regression Result

	Initiation	Adoption	Routinization
Technology Readiness	-0.11	0.50***	0.12
Technology Integration	-0.06	-0.05	0.33**
Firm Size	0.06	0.26*	-0.03
Global Scope	0.37**	-0.18	0.07
Management obstacles	-0.11	0.19	0.15
Competition Intensity	0.07	-0.01	0.14
Regulatory Environment	0.06	0.05	0.15

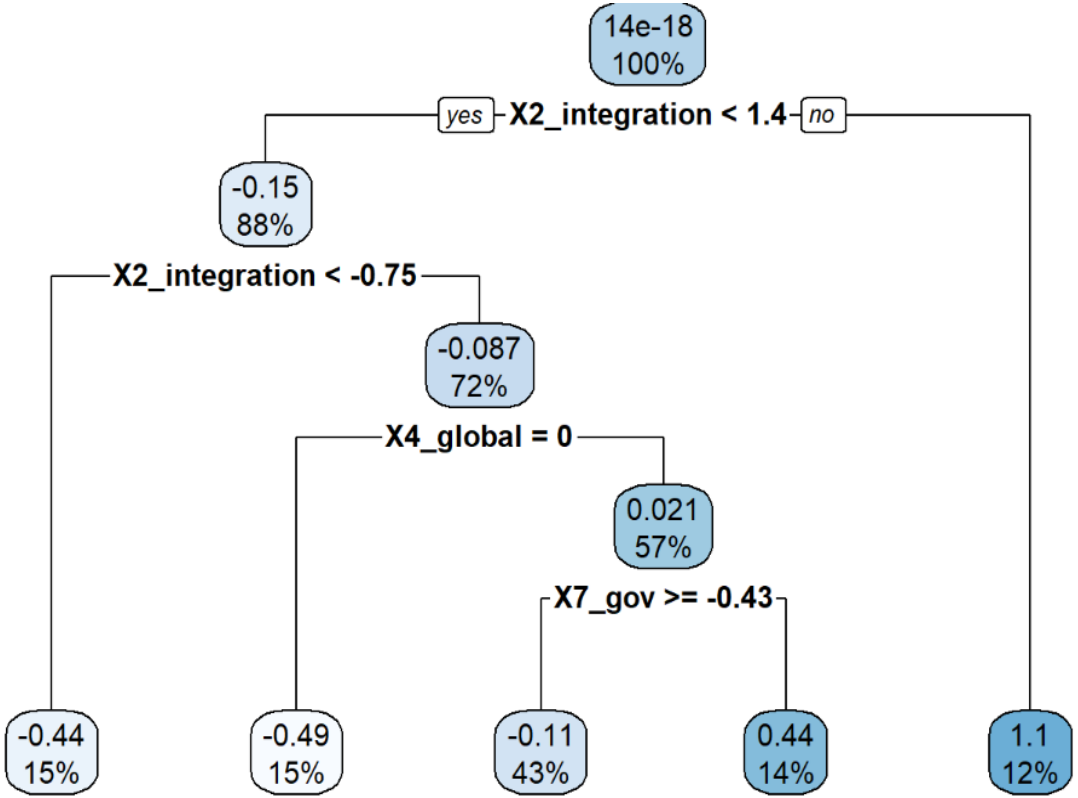
Table 1: Coefficients and their siginifice levels. *** means $p < 0.001$, ** means $p < 0.01$ and $*$ means $p < 0.05$.



Regression Tree – Initiation



Regression Tree – Adoption



Regression Tree – Routinization

Discussion and Remark

- Multivariate Regression
  - Provide significance level.
  - Highly depend on model assumption.
- Decision Tree
  - No parameter needed.
  - High interpretability.
  - Highly dependent on data.


Thank you!