On the Effectiveness of Minisum Approval Voting in an Open Strategy Setting: An Agent-Based Approach

Joop van de Heijning, Stephan Leitner, and Alexandra Rausch

Joop van de Heijning
Digital Age Research Center
University of Klagenfurt
johannes.vandeheijning@aau.at
Resume

• **PhD student** 2019-
  – University of Klagenfurt
  Digital Age Research Center

• **MSc Computational Science** 2015-2019
  – University of Amsterdam

• **BSc Computer Science** 2012-2015
  – Open University Netherlands
Agenda

- Open Strategy
- Research Gap and Research Question
- Methodology
- Results
- Conclusion
Open Strategy (OS)

• Rising research interest (Seidl, Von Krogh, and R. Whittington, 2019)
• Defined as
  – Inclusive
  – Transparent
  – (social) IT enabled (Tavakoli, 2015)
• Better-performing strategies (Sailer, Schlagwein, and Schoder, 2018)
Research Gap and Research Question

- Lack of experimental evidence
- How do
  - the number of strategy-making participants
  - the level of an organizations’ complexity
affect the discovery of better-performing strategies in an OS approach?
Methodology

- Agent-based simulation, because (Leitner and Wall, 2015)
  - data
  - mathematical tractability
- Based on the NK model (Kauffman and Weinberger 1989)
  - Fitness landscapes -> performance landscapes
  - $N$ is number of decisions, $K$ is number of interactions
Simulation

- An organization *(the firm)*
- Stakeholders
- Diverse objectives
- Aggregation mechanism
Open Strategy as a Practice (Tavakoli, Schlagwein, and Schoder, 2017)

• Praxis:
  – cyclic strategy process
  – context
  – phases

• Practitioners:
  – participants in the praxis
  – utility

• Practices:
  – tools and mechanisms
  – minisum approval voting
Overview

practitioners
the firm, ..., stakeholders

praxis
Start $t:=1$

Preparation $\rightarrow$ Generation $\rightarrow$ Selection $\rightarrow$ Implementation

$t:=t+1$
Yes

$t<T$

No

End

practices
• Preference aggregation mechanisms
• Voting procedures
Preparation phase

• Initialize
  – Firm, stakeholders and their performance landscapes according to NK framework \((N = 10)\)
  – Correlation between landscapes
  – Starting strategy
  – Communicate starting strategy to stakeholders

• Fix scenario parameters
  – Aggregation mechanisms
  – Number of stakeholders
  – Complexity
Generation phase

- Discovering and evaluating 2 alternative strategies
  - In the neighborhood of strategy in \( t - 1 \) (Hamming distance)
  - Evaluated according to expected performance (stakeholders’ landscapes)
  - Evaluation error
  - Stakeholders submit best alternative for aggregation

- Distilling alternatives to a shortlist
  - Minisum approval voting
  - Result is three best rated alternatives plus current strategy
Selection phase

- Stakeholders evaluate distilled shortlist
  - Shortlist is communicated to stakeholders
  - Stakeholders evaluate and rank alternatives on their own landscapes
  - Evaluation error

- Borda count voting
  - Allocates points based on rankings
  - Alternative with highest points wins
Implementation phase

- Implementation of the winning strategy
- Computation of associated performance in the firm’s landscape
- Track performance for analysis
- Implemented strategy becomes the current strategy in $t + 1$
Results (1)

- Moderate level of complexity ($K = 4$)
- Opening up the strategy process leads to rapid discovery of higher performing strategies
- Number of stakeholders significantly affects performance
Results (2)

- High level of complexity ($K = 7$)
- Similar patterns
- Significantly better strategies only for higher number of stakeholders
Discussion

- OS can lead to the discovery of better performing strategies
- Results are less pronounced in complex environments
- In a highly complex environment with a smaller number of participants, OS does not seem to offer this benefit
- Sensitivity analysis confirms the expectation that higher correlation among landscapes leads to higher performance
Limitations and Future Work

• Limitations
  – Complexity that might capture critical aspects of reality is eliminated
  – Stakeholders preferences are constant over time

• Future work
  – Network effects among stakeholders
  – Egalitarian vs. utilitarian aggregation
  – Further sensitivity analyses over control variables
Thank you for your attention

If you have any questions or comments, please contact me on

Joop van de Heijning
Johannes.vandeheijning@aau.at
References