Skoltech
Skolkovo Institute of Science and Technology

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Maksim Malyy

PhD Program: Engineering Systems

Title of Thesis: The data-driven model of technology-based new ventures growth

Supervisor: Associate Professor Zeljko Tekic, HSE University

Name of the Reviewer: Professor Alexey Nikolaev, Skoltech

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	**Date: 14-02-2022**

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

The thesis of Maksim Malyy is devoted to the development of a data-driven model for technology based new ventures growth. The theme is of great interest and importance from both academic and practical points of view. Constantly dealing with uncertainty of markets, risks of technology development and product manufacturing, specifics of technology and new product adoption and acceptance, the need of finding and implementing effective business model, etc. management of new technology based ventures really needs reliable tools and methodologies for data-driven decision making at both strategic and tactical level for the effective and efficient development of their companies. The novelty of the thesis is the application of Google Trends data as the source of the information and the basis for further analysis.

The thesis has clear logical structure. The text is prepared with high quality of the both literature review as well as original research performed by the author. The topic of the dissertation is well-correlated with its actual content.

In the research the author uses several research methods. For example, to investigate and validate applicability of Google Trends data to the detection and estimation of a company growth, the author comparatively analyzes the relationship between companies' evolution curves represented by search activity with the valuations achieved through rounds of venture investments attracted by the company.

The scientific significance and novelty of the results obtained can be structured around the following themes:

- The author suggests, investigates and validates applicability of Google Trend data as a proxy for examining and evaluating companies' valuation dynamics.
- As the further elaboration of the theme above, the work suggests that the S-curve model reflects the companies' evolution pattern in the best possible way compared to the other typically used growth curves.

The suggestion of Google Trends data as the data source for new technology based venture growth evaluation and modeling as well as other results and suggestions of the thesis, are of clear practical value.

As the themes to be additionally addressed by the author (may be as the directions for the further research) I would like to suggest the following two major groups of topics: (1) limitations for the applicability of the proposed approaches and models; (2) opportunities and limitation for the converting of the proposed model from backwards looking retrospective study towards forward looking prediction of a company growth dynamics.

Namely, even though the thesis includes considerations on the limitations for the applicability of the proposed research and its conclusions, they require additional elaboration. The breadth and variety of technology based new ventures (varying in technology and its development lifecycle, business/partners ecosystems readiness and maturity, target markets, product adoption lifecycle specifics, exit strategy the company founders pursue, business model features, company publicity strategy, etc.) may not fit into correlations revealed by the thesis study and result in wrong estimations of the company growth and its OLC stage. Further clustering and classification of technology based new ventures with respect to their specifics and applicability of the proposed models can be suggested as the direction for the future research.

The second block of suggestions deals with the consideration of the opportunities and limitations for the predictions to be made basing on Google Trends data. This also can be related to the directions of further study and include, for example, consideration of what amount and character of data (e.g. Google Trends

observations time window, variability of data with time, etc.) can be considered as the basis for further dynamics prediction and with what accuracy probability.

Considering all the above, the research presented in the thesis features pioneering approach of high scientific and practical application significance. The thesis can be recommended for the formal defense procedure.

Provisional Recommendation

X☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense*

☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

☐ *The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*