

Does Lean Startup Work? Evidence from Randomized Control Trials

Stefanos Zenios

Stanford Graduate School of Business

Abstract

Lean Startup is a business methodology for the creation of new ventures. It is based on the premise that each startup is a set of hypotheses that need to be validated experimentally with low resolution experiments. This methodology is widely used by Startups and encouraged by investors. Yet rigorous evidence on its effectiveness is lacking. In this talk we conceptualize the lean startup methodology as a Bayesian sequential hypothesis testing model in which the entrepreneur tests among multiple hypotheses can select among multiple different experiments to run in each period. We formulate a reward function in which the entrepreneur is rewarded for making correct decisions and penalized for making incorrect. We show that in a well-defined asymptotic regime of marginally informative experiments, the underlying stochastic control problem converges to a stochastic diffusion control problem that admits a closed form solution when there are two hypotheses. With three or more hypotheses we derive a set of heuristics. These heuristics represent a lean startup approach to experimentation. We compare the performance of these heuristics to the performance of simpler (non-lean) policies that used large scale experimentation in the context of a Randomized Control Trial. We demonstrate that the lean startup policies can reduce the investment needed to test a hypothesis by as much as $2/3$ and more than double the ROI.

Note: This is joint work with Zhengli Wang and Yuwuei Luo and is an extension of the model in *Adaptive Design of Clinical Trials: A Sequential Learning Approach*