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Title: Mobile Applications and Entrepreneurship

Introduction

Entrepreneurship in the digital sphere looks different. Traditional entrepreneurial ventures were supply-side driven, whose activities consisted of: procurement of inputs, production of goods, and distribution of goods. Today, many entrepreneurial ventures are demand-side driven. If supply-driven businesses thrived on the accumulation of physical capital and economies of scale that minimized costs, demand-driven businesses thrive on the accumulation of users and social networks that together maximize value. Hence, competition on the demand-side does not depend on financial capital, machinery, or even human capital but rather on millions of users and the network effects generated by their interaction. In short, keys to competitiveness now hinge on orchestration of resources rather than control of critical assets (Parker et al. 2016).

Many of digital entrepreneurial ventures are multi-sided platforms (MSPs), which are intermediaries driven by network effects. MSPs are "characterized by the presence of two (or more) distinct sides whose ultimate benefit stems from interacting through a common platform" (Rochet and Tirole, 2003). Their value-adding activity involves the reduction or elimination of transaction costs in the market. In recent decades, MSPs have come to disrupt many traditional businesses on a global scale (Stone, 2017). Industries that underwent major transformations include finance, communication, advertising, operating system as well as various internet-based industries ranging from real estate to transportation. Interestingly, for MSPs, the reduction of transaction costs occurs *outside the firm* in the market as opposed to *inside the firm* as was observed in traditional businesses (Coase, 1937). Malone, Yates, and Benjamin (1987) predicted presciently some thirty years ago that ICT would transform the way economic activity is organized. They developed a schematic for assessing which economic activities would be more likely to undergo disruption than others based on two key predictions about coordination costs and asset specificities. First, they predicted that ICTs would reduce the unit costs of coordination and thereby increase the proportion of economic activities transacted by the market instead of the hierarchy (e.g. firm). Second, they predicted that ICTs would decrease asset specificities over time. Today, the "Sharing economy," particularly Airbnb and Uber, has made monetizing consumer assets with lowest utilization rates possible (Sundararajan 2016).

Entrepreneurship in the demand-side economy has simultaneously become easier and more difficult. Network effects have a tendency to unleash winner-take-all competition, which increases industry concentration and lowers entrepreneurial entry. By the same token, network effects have turned competition more "Schumpeterian," such that entrepreneurial entry has increased and disruption of incumbents become more prevalent (McAfee and Brynjolfsson, 2017). With digital goods, marginal cost of production is essentially zero and the Information Communication Technologies (ICT) infrastructure has made distribution instantaneous and free. Mobile app development market has experienced rapid entry and growth as Apple and Google lowered the

costs of development and distribution (Bresnahan et al., 2014). In fact, App development has become one of most common forms of entrepreneurship (Haefliger et al., 2010).

Research

My research attempts to incorporate literature on network effects into research on entrepreneurship and explores the demand-side economics of entrepreneurship. More specifically, I want to examine entrepreneurship in the mobile application sphere. There is surprisingly little empirical research done on mobile app entrepreneurship. Yin, Davis and Muzyrya (2014) is the only study that specifically attempted to conduct empirical research. I want to examine a number of questions: (i) Has the mobile app platform lowered entrepreneurs' barriers to entry? This research question builds on Malone, Yates, and Benjamin (1987) and (McAfee and Brynjolfsson, 2017). My hypothesis is that while mobile app platforms may have not done much to lower the barriers to entry, transactional platforms, such as Uber, Airbnb, Amazon Marketplace, and eBay, have helped entrepreneurs reach their customers (ii) Which monetization strategies have best taken advantage of network effects for profit? The most common revenue model involves targeted advertising to its platform users. For Google, advertisers are the money side and Google users are the subsidy side. Another common revenue model involves commissions where users get charged per transaction. Airbnb charges the guest 6 to 12 percent and the host 3 percent for every transaction. Uber charges its money-side, drivers, 20 to 25 percent per transaction but does not charge its subsidy side, its riders.

Data

Best quality data are collected by Appbase and comScore. Appbase has the near universe of mobile applications data. 5.9 million apps on Apple and Android platforms. Data app company include the company name, key developer, number of social media page followers, and number of employees. Information on the monetization strategy and rival products is useful for comparative analyses. Data on mobile app developers (e.g. name and country of origin) will reveal the geographic distribution of skilled developers as well as lend comparative lens on countries in the frontier. Data is also available on consumers (e.g. user demographics, available language, country). Major shortcoming of Appbase is the absence of information about number of downloads. Hence, Appbase needs to be supplemented by the Mobile Metrix database provided by comScore. Its database has estimates on 4,000 apps with at least 3,000 monthly unique visitors for a period between January 2015 and March 2018.

Budget

I will need to purchase monthly subscription to these services. Appbase is $750 per month and Mobile Metrix has a starting package priced at $799 per month. I may need to hire some additional hourly workers to collect data on specific mobile apps.

Bibliography

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Sundararajan, Arun. *The Sharing Economy: The end of employment and the rise of crowd-based capitalism*. MIT Press, 2016.

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Employment

2017 - Research Assistant for Dr. John S. Earle on a National Science Foundation grant

Education

2014 - Ph.D. in Public Policy, George Mason University
2014 M.A in Political Science, Middle East Technical University
2011 B.A in Business Administration, University of Illinois at Urbana-Champaign

Research Areas

Entrepreneurship, Science and Technology, Policy Analysis, Economic Development

Working Papers

- "Multisided Platforms, Network Effects, and Knowledge Spillover Theory of Entrepreneurship" (with Dr. Zoltan Acs)
- "Evaluation of a Place-based Policy: Special Economic Zones in Russia."

Referred Publications

- "Regional Economic Cluster Development Opportunities in Georgia." (with David Akhvlediani, Nikoloz Abuashvili,and Natalia Partskhaladze) in *Ongoing Issues in Georgian Policy and Public Administration.* Ed. Bonnie Stabile, Ed. Nino Ghonghadze. Washington, DC: Westphalia Press, 2016. Print. (April 2017)
- "Four Reformers in Russia's Shock Therapy." *Vestnik, The Journal of Russian and Asian Studies 19 (April 2016).*

Conferences

- "Cluster-Based Industrial Development in Kaluga, Russia", 2015 Conference on International Development – Best Practices and New Approaches: Adapting Development to the 21st Century, Fairfax, VA, March 19-21, 2015.
- "Governor Artamonov's Miracle: Special Economic Zone in Kaluga, Russia", APPAM 2015 Fall Research Conference: The Golden Age of Evidence-Based Policy, Miami, FL. November 12-14, 2015.
- "Interaction of Clusters and Special Economic Zones in Russia", XVII International Academic Conference on Economic and Social Development, Moscow, Russia, April 20-22, 2016.

Honors, Training, Scholarships, and Fellowships

2014 -	Full Tuition Scholarship, GMU, Schar School of Policy and Government
2017	Cross-Sectional Econometrics, Continuing Education, AEA,
2016	Travel Grant, GMU, Office of the Provost and Executive Vice President
2016	United Nations Association-National Capital Area Graduate Fellowship
2011	Certificate in Global Business Culture with Specialization in Russia
2010	Korean American Scholarship Foundation (KASF), Scholarship
2008, 2009	University of Illinois, International Student Services, Scholarship

Teaching Experience

2017	Teaching Assistant, Schar School of Policy and Government, Entrepreneurship and Economic Development, Fall Semester (PUBP 781)
2016	Teaching Assistant, Schar School of Policy and Government, Statistical Methods for Policy Analysis, Spring Semester (PUBP 511)
2012 - 2014	Teaching Assistant, Department of Economics, Middle East Technical University (Undergraduate Microeconomics, Macroeconomics, and Engineering Economics).

Other Research Positions

2017	Research Assistant for Dr. Eric McGlinchey on a $1.5 million Department of Defense, Minerva grant conducting quantitative survey analysis, investigating the U.S. Soft Power in Central Asia, Spring semester
2014 - 2016	Research Assistant for Dr. Terry Clower, Center for Regional Analysis, GMU (Research economic and social topics related to the current and future growth of the DC metropolitan area)
2012	Research Assistant for Dr. Jeffrey Loewenstein, College of Business, UIUC
2011	Research Assistant for Dr. Eric Neuman, College of Business, UIUC
2011	Stryker Corporation, Human Resources Specialist
2010	Korea Trade-Investment Promotion Agency (KOTRA), Intern

Professional Affiliations

2016 -	American Economic Association
2014 -	Association of Public Policy and Management

Skills

Languages:	Korean (native), English (fluent), Russian (fluent)
Programing:	STATA