

ICTs for Inclusive Growth: E-Entrepreneurship on the Open Internet

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Access to the open Internet has created exciting new possibilities for entrepreneurs worldwide. The Internet increasingly crosses the digital divide to reach those previously excluded from economic opportunity. Not only can these new users consume what is already online, but they can also create, using the Internet to improve their education, research new ideas, raise money, collaborate, and start their own companies—opportunities that would be unimaginable for them without access to the open Internet.

The most obvious impact of the Internet for entrepreneurs is the creation of a whole new segment of online startups, which are able to target a global market of nearly 3 billion Internet users while incurring low distribution costs. The largest of these startups, including Google and Facebook, are now taking their place among the most valuable companies in the world.

It is no surprise that many of the early large Internet startups—including Netscape, eBay, Yahoo!, and Google—are located in California's Silicon Valley. These companies all benefited from the same conditions that led to the development of Silicon Valley as the largest and best-known cluster for high-tech startups—conditions that include access to Stanford University, to venture capital, and to a large pool of skilled employees.

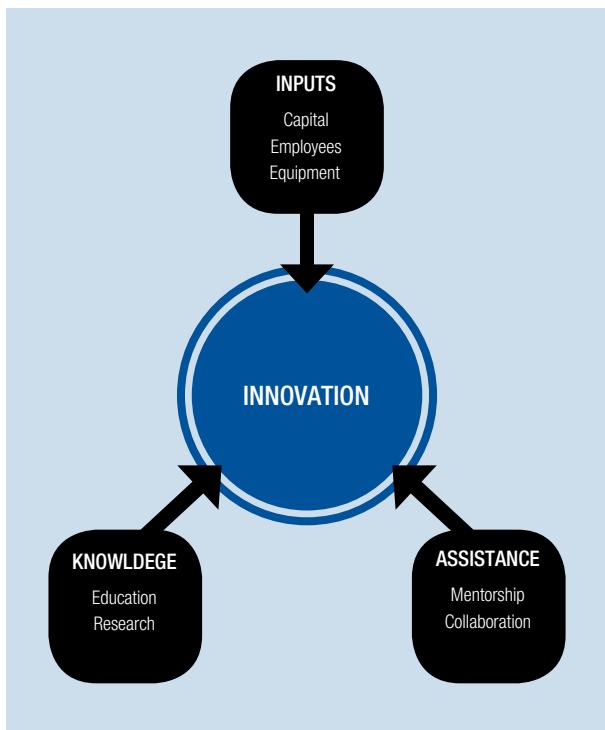
Not everyone is able to benefit from access to a cluster, but everyone *can* benefit from the new opportunities now available, as many of the important inputs for startups are migrating online. These include tangible inputs, such as venture capital and computing capacity, along with less tangible ones, such as mentorship and collaboration. All of these foster innovation. As a result, the possibilities for entrepreneurship are expanding beyond the traditional boundaries of high-tech clusters to include all people in all regions that have access to the open Internet.

As the activity of innovation becomes more inclusive because more people—across countries and income levels, education, and gender—are able to create novel enterprises, so too are the results of innovation becoming more inclusive, because many new entrepreneurs focus their efforts on filling market gaps close to home. To foster this new source of startups, policymakers can focus on ensuring that Internet access is widely available, affordable, and open.

STARTUPS AND CLUSTERS

Innovation is one of the key means to achieve faster economic growth, and entrepreneurial startup companies are a significant source of innovation, particularly in the information and communication technologies (ICT) sector. Although anyone can innovate in theory, in practice many of the ingredients for successful startups are historically concentrated in

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Figure 1: Ingredients for an innovation startup

clusters such as Silicon Valley, access to which can be a barrier for many would-be entrepreneurs.

For the purposes of this chapter, we divide the ingredients for successful startups into three categories:

- *Knowledge:* Education is a critical component of innovative startups because it provides a general background in fields of interest; research then helps to identify current market gaps and identifies the specific knowledge required to help fill the gaps.
- *Inputs:* Venture capital, skilled employees, and ICT equipment are usually critical inputs needed to turn an innovation into a startup company.
- *Assistance:* Finally, to enhance the value of the innovation, mentorship and collaboration are important to provide business acumen throughout the startup phase and beyond.

Traditionally, these ingredients are collected in a high-tech cluster—a geographic concentration of companies, in one or more related industries, that includes suppliers and related service providers and that covers the entire range of the innovation cycle from startup to established company. As a result, having a presence in a cluster has been virtually essential for high-tech startups.

Silicon Valley is not just the first, but also the most successful, example of such a cluster, highlighting the benefit of close proximity to the ingredients listed in Figure 1. It is home to Stanford University, which has a top electrical engineering program, and which provided

early input to the creation of Silicon Valley.¹ However, not only formal knowledge is important: there is a web of inputs that are critical to the success of a high-tech cluster such as Silicon Valley.

Shockley Semiconductor Laboratory, established in 1956 in Mountain View, California, to work on silicon semiconductor devices, arguably pioneered the growth path and eventual nickname of Silicon Valley. At that time, the region was so rural that it did not yet have long-distance telephone service, and it proved difficult to lure engineers from the better-established East Coast industrial base. However, those who did join Shockley made their mark. Among them were eight who famously left to form Fairchild Semiconductor, and from there a cascading series of dozens of companies (known as the “Fairchildren”) were established—including Intel and the leading venture capital company Kleiner Perkins Caufield & Byers.

Google provides a classic example of the benefits of Silicon Valley as an innovation-fostering cluster. Founders Larry Page and Sergey Brin met as students at Stanford University in 1995, where they started Google two years later. They developed a new type of search engine during their academic research and ran it on the Stanford servers until it overwhelmed the campus network. Google then moved to a nearby garage, raised money, hired a CEO, and established its headquarters, all within the Silicon Valley cluster. These humble beginnings resulted in a company that is now worth close to US\$400 billion.

Given the success of Silicon Valley in encouraging high-tech startups and enhancing economic growth, it is not surprising that many attempts have been made to duplicate its success in other countries, often with government backing. Examples of clusters established elsewhere include Silicon Alley in New York City, Cambridge Science Park and Tech City London in the United Kingdom, Silicon Wadi in Israel, Paris Saclay, Skolkovo Innovation City in Russia, Bangalore in India, Zhongguancun in China, and Hsinchu Science Park in Taiwan, China.

The French government has promised to invest €5 billion into their Paris Saclay complex,² Mayor Bloomberg invested in endeavors such as the We Are Made in New York initiative to make New York more attractive as a technology hub,³ and the Russian government is planning to invest about US\$4 billion in the Skolkovo Innovation City from now until 2020.⁴

Many of the crucial elements contributing to the success of Silicon Valley create powerful network effects that have made it difficult for other clusters to approach the same level of success, however. For a government, creating a cluster requires political capital, investment capital, and patience—assets that not all governments enjoy in abundance.

Regardless of their ability to provide opportunities equivalent to those of Silicon Valley, these new clusters

Box 1: Examples of the results of access to the open Internet

Access to online education can be a life-changing experience for an individual. One such person is Battushig Myanganbayar, a Mongolian student who achieved a perfect score on MIT's Circuits and Electronics MOOC lecture at the age of 15. As a result, he was admitted as an undergraduate to MIT, where he also provides input to MITx, part of the edX initiative, to help others in his situation. As he explained, the online course provided him with valuable information and knowledge, which he demonstrated by inventing a Garage Siren to signal his younger sister and other children to move away from an approaching car.¹

The open Internet also allowed Kodjo Afate Gnikou from Togo to design the W.Afate 3D printer at a cost of US\$100

each, using money he raised online.² He developed his plan based on the Mendel design, which was available online as a result of a collaborative open source network. The result is a good example of a social innovation that makes 3D printing available to lower-income groups. At the same time, the printer is designed largely using the electronic waste—discarded electronic devices—accumulating in parts of Africa, thereby addressing a social and environmental problem at the same time.

Notes

1 Pappano 2013.

2 Ungerleider 2013.

have clearly created opportunities in other countries for entrepreneurs. Nonetheless, clusters are formed around a physical presence, which excludes many would-be entrepreneurs. Not every country has a cluster, and not everyone can relocate to an existing cluster.

Many of the ingredients required to launch a successful startup can now be found online, however. This shift significantly alters the landscape for entrepreneurs around the world, enabling them to overcome not just lack of proximity to a cluster, but also low income, gender bias, educational background, and physical disabilities.

ONLINE STARTUP INGREDIENTS

Access to the open Internet not only can enable entrepreneurial activity to shift online, but also can open opportunities for more inclusive growth from both a demographic and a geographic perspective. This section looks at key ingredients of the startup process to highlight how entrepreneurs can succeed with access to the open Internet.

Knowledge

Education, particularly technical education, was an early and natural adopter of online technology. In 2001, the Massachusetts Institute of Technology (MIT) introduced its OpenCourseWare project to make its course materials available for free online, and thereby launched the Open Educational Resources movement. More recently, Massive Open Online Courses (MOOCs) have been created to broadcast classroom lectures online. Coursera, edX (jointly created by MIT and Harvard), and Udacity are platforms through which universities may provide their open online courses.

The result of these efforts has been to lower the cost and increase the reach of educational resources, thereby removing significant roadblocks to education. Coursera, for instance, had 22,232,448 enrollments from 190 countries as of January 2014.⁵ Furthermore, about 33 percent of subscribers to edX have previously

obtained no more than a high school education.⁶ This is evidence that open online courses can help educate anyone—with the restrictions of little prior education, affordability, or physical distance—who has an Internet connection and who is both willing to study and motivated enough.

Research is another integral part of the background needed for innovation. Access to the open Internet can provide critical background knowledge not just in developing an innovation, but also in providing the business knowledge for commercialization. Furthermore, the results of innovation are often themselves available online via open source in order to lower the cost of further innovations, as in the example of the 3D printer developed in Togo (Box 1).⁷

Inputs

Capital is perhaps one of the most difficult inputs to obtain, and it is one of the most crucial. Normally, one goes through the channels of venture capital or angel investment in order to fund a startup. However, the Internet has provided a novel way to raise capital: crowdfunding, whereby entrepreneurs make available their plans and raise money from other Internet users, often in exchange for an early and discounted result of the innovation. It is estimated that the total amount raised through crowdfunding in 2012 was US\$3 billion; this was expected to exceed \$5 billion in 2013,⁸ challenging the US\$8.91 billion expected to be invested in Silicon Valley in 2013.⁹

Kickstarter, one of the most prominent crowdfunding platforms, has a cumulative total of US\$1,261,742,200 in pledges since its founding in 2009 through August 2014, funding 67,402 projects.¹⁰ Pebble, the first notable smartphone, is to date the most successful Kickstarter project. It raised \$10,266,845 (more than its original goal of only \$100,000),¹¹ before the founders halted the appeal. Eric Migicovsky, one of the inventors of Pebble, noted, “had it not been for Kickstarter ... Pebble may not have been funded at all.”¹²

Box 2: Opportunities for inclusion resulting from freelance sites

Freelance sites such as Elance allow workers to overcome obstacles and improve their economic standing. One Indian programmer faced discrimination as someone differently abled, which also made it difficult to commute to work, but was able to become self-employed and work at home for clients around the world using Elance.¹

In another example of increased opportunities, an online platform in the Middle East—Nabbesh—provides flexible employment opportunities that are particularly important for women who are required to work from home.

Note

1 Elance 2013.

Crowdfunding is novel because it disrupts the traditional constraints of obtaining venture capital and eliminates one or more middlemen by appealing directly to the eventual customers to back the startup. Significant indications of gender and geographic bias are apparent in startup investing, and early evidence suggests that, in the United States at least, crowdfunding is helping to overcome this bias by enabling more women to act as funders while also increasing the average distance between the funders and the founders.¹³ As a result, crowdfunding can result in more inclusive access to capital.

Although Kickstarter funds startups based in only five countries today, other platforms—such as Indiegogo and Ulule—are available in many countries. Indeed, the inventor of the W.Afate 3D printer in Togo (see Box 1) raised over €4,000 online using the crowdfunding platform Ulele.¹⁴ Many other successful projects and inventions might have gone unrealized without online crowdfunding.

Another critical input for startups is **employees**. One reason that companies are attracted to high-tech clusters is their concentrated availability of large pools of skilled labor. At the same time, research shows that diversity of employees drives innovation.¹⁵ Online recruitment does not just facilitate hiring, but can also increase diversity by facilitating access to a global pool of workers. LinkedIn alone has more than 313,000,000 registered users around the world,¹⁶ which significantly expands both the labor pool for startups and the opportunities for employees, further reducing reliance on a cluster for hiring.

Furthermore, online platforms can allow employers to efficiently fulfill specific tasks without full-time employees by creating a market for freelance workers. Such online platforms include oDesk, Elance, and Freelancer. As of 2014, Elance had 3,626,017 freelancers registered, with total earnings of US\$1,291,508,388

between its founding in 2008 and the end of 2013.¹⁷ Freelance sites not only provide inclusive employment opportunities (Box 2), but some freelancers even go on to start companies themselves and begin hiring their own freelancers to fulfill their jobs.¹⁸

In sum, these online platforms provide job opportunities for those otherwise excluded through geographic borders, gender, or ability, while at the same time increasing the diversity of companies, which can stimulate further innovation.

Another significant input that startups may require is the information technology (IT) **equipment** needed to operate the business—clearly a critical component in particular for companies offering online services. Purchasing necessary equipment such as servers entails a capital expense whose scale may be difficult to justify up front, but infrastructure can now be accessed as a scalable operating expense thanks to cloud computing. As a result, cloud computing reduces entry barriers;¹⁹ it also makes access to advanced computing platforms more inclusive globally—for instance, Amazon's cloud service is available in 190 countries.

Assistance

Entrepreneurs may obtain advice and help establishing a business through **mentorship**, which is a significant benefit of clusters but is perhaps more important in regions where entrepreneurship is less established. An example of online mentorship comes from the Mara Foundation, a part of the Mara Group whose founder, Ashish Thakker, is himself a role model whose family was displaced first from Uganda and then Rwanda before he founded the company at age 15. The Mara Foundation released the online Mara Mentor application, which is followed by 140,000 young entrepreneurs in Africa.²⁰ The Mara Foundation and UN Women have also started a partnership to help empower female entrepreneurs around the world.²¹

Collaboration is another indispensable feature of clusters, aspects of which are migrating online where, as with employment, opportunities for diversity are increased (Box 3). Various facets of collaboration—ranging from informal discussions, achievable through a large variety of communications applications such as Cisco's WebEx, to more formal efforts to work together on a common problem—are facilitated online.

GitHub is a promising example of how collaboration can be achieved online. This platform provides tools for developers to work together on projects,²² enabling programmers around the world to collaborate from their respective locations without having to be present in one specific place. This ability has a particular impact on talented programmers in developing countries who may find the assistance needed to develop their innovative ideas into real products/services. Today, GitHub has roughly 6.8 million people collaborating across its 15.2 million project repositories.²³

CASE STUDIES

There are many examples of ways in which access to the open Internet enables inclusive growth of startups. Although startups such as Pebble may have occurred without access to online ingredients such as Kickstarter, many others owe their existence to their online origins. For instance, the 3D printer from Togo described in Box 1 could not conceivably have been developed without open access to the Internet.

In addition to their online origins, many entrepreneurial efforts in developing countries are targeted toward filling important gaps in the markets in which they were created. These gaps are well understood by developers in their home markets; they are also likely overlooked by entrepreneurs in more-established clusters. For instance:

- Esoko is an online startup from Ghana that sends texts messages to its users about price and stock information,²⁴ which is widely used in Africa for agricultural purposes.
- Watch Over Me (formerly SecQ.me) is a personal safety application from Malaysia that makes it easy to summon help. It was developed in response to alarming accidents or crimes involving the founders and their family. After launching the application, an alert will be triggered if the user does not indicate that he or she has arrived safely.
- Ushahidi is a nonprofit organization based in Kenya whose goal is the development of free and open-source software for crowdsourced mapping. The organization was started in order to track post-election violence in Kenya in 2008.

Another group of startups not only benefit from the inclusive online opportunities, but are also themselves platforms that support further inclusive innovation. Their founders used online ingredients to create local tools to further enable other entrepreneurs to succeed. Examples include:

- Roya Mahboob is the founder of Afghan Citadel, which encourages “entrepreneurship on the Digital Silk Road by bringing Internet access, IT hardware, and social-media education to tens of thousands of Afghan students ... [thus] giving women and youth the tools they need to launch successful online businesses.”²⁵
- Nabbesh, mentioned above, was set up by Loulou Khazen Baz in the United Arab Emirates to help local youth find employment and provide an opportunity for Emirati women to work from home. In order to launch Nabbesh, a crowdfunding project was launched on Eureeca; within 12 days, Nabbesh managed to raise its goal of US\$100,000.²⁶
- The Women’s Digital League, founded in Pakistan by Maria Umar, is an organization that provides IT

Box 3: Online collaboration: A tool and a resource

GitHub is also becoming a valuable online recruitment tool, as it allows prospective employers to review a candidate’s portfolio of work on collaborative projects of their own or belonging to others. This allows self-taught developers to demonstrate their skills directly without having a traditional education or work background on their CV. GitHub thus allows employers to find talented engineers in regions where education and direct work experience may still be in short supply.¹

Note

¹ Stucchio 2013; Terdiman 2012.

centers in rural areas and helps to train the women in these areas for jobs using this technology.

Women’s Digital League then employs the trained women for jobs such as simple data entry tasks or more advanced jobs like word press, wiring, and graphic tasks.²⁷

These new platforms help to make entrepreneurial opportunities more inclusive, and allow others to follow in the footsteps of their founders.

INNOVATION HUBS

Although online ingredients enable entrepreneurship outside a traditional high-tech cluster, the role of the cluster may not be completely supplanted. Recent years have seen the rise of a new model for supporting entrepreneurs in developing countries: the innovation hub.²⁸ Such a hub is typically a community of entrepreneurs who share an open office space and who develop the hub as a bottom-up effort to help enable innovation.²⁹ Innovation hubs play many roles, not the least of which is providing reliable Internet access to enable access to the online ingredients described above.³⁰

These innovation hubs may also serve to fill another key gap in the needs of online entrepreneurs. Although it is true that most, if not all, of the ingredients necessary to develop an innovation into a startup are available online, the need to initiate personal relationships face-to-face—even if they are then maintained online—is one feature of high-tech clusters that may still be crucial. Filling this need is a critical role of innovation hubs. As described in an interview with Erik Hersman, the founder of iHub in Nairobi, they serve the function of bringing people together to create trust among investors, entrepreneurs, and employees, and—in his words—to “increase serendipity.”³¹

Although many are in their early stages, the innovation hubs have already created notable successes. For instance, iHub in Kenya fostered the recently launched BRCK, an Internet connectivity

device that provides power and access in challenging environments.³² In Ghana, a notable success is Dropifi, a customer engagement tool that helps businesses to communicate with customers in a faster and more efficient way. This application was developed in the Meltwater Entrepreneurial School of Technology (MEST) incubator in Ghana and has since won several awards for startups.³³

At innovation hubs, startups access the Internet for many of their essential ingredients while also benefiting from face-to-face opportunities for entrepreneurs to meet. This concept is relatively new, and it is not yet clear how these hubs may evolve as their members succeed and exit them. For instance, Dropifi, noted above, was incubated in Ghana but has since joined a Silicon Valley accelerator program.³⁴ A topic for future research would be to track how successful companies such as Dropifi evolve over time and how they retain or modify their relationship to their innovation hub, and how the surrounding innovation ecosystem adapts.

CONCLUSION

The Internet is not merely creating a new segment of online companies that entrepreneurs can target, but is also providing ingredients that can help foster entrepreneurs in their efforts. Although there appears to be no risk on the horizon to Silicon Valley's ability to attract and foster significant startups, geographic and demographic constraints mean that not everyone who could be a successful entrepreneur has access to Silicon Valley.

Numerous public initiatives have attempted to duplicate the success of Silicon Valley, with limited success. However, as this chapter shows, fully duplicating such a cluster may no longer be necessary: many of the ingredients of success required by entrepreneurs can now be accessed online, by anyone, anywhere, with open Internet access.

Consequently, instead of focusing on fully duplicating a high-tech cluster, governments could focus on creating an enabling environment. Such an environment would notably include Internet access that is widely available, affordable, and open. Access to the open Internet will then allow for more inclusive innovation—not just within developed regions but also extending to emerging countries.

This new online entrepreneurship can enable entrepreneurs to surmount barriers not only of their physical location, but also barriers of education, gender, and physical disability. In addition, the innovations that result from access to the open Internet may themselves be inclusive, addressing needs in their home markets.

NOTES

1 Saxenian 1985, p. 22.

2 EPPS 2014.

3 Bloomberg 2013.

- 4 Grant 2013.
- 5 Coursera 2014.
- 6 O'Connor 2014.
- 7 Mueller 2014.
- 8 CrowdFund Capital Advisors and Fajr Capital Advisors 2013; Best and Rehman 2014; Crowdsourcing.org and Massolution.com 2013.
- 9 Silicon Valley Bank et al. 2013.
- 10 Kickstarter 2014c (data from November 8, 2014, 18:35).
- 11 Kickstarter 2014b.
- 12 Newton 2012.
- 13 See, respectively, Greenberg and Mollick 2014; Agrawal et al. 2011.
- 14 Ulule 2014.
- 15 See Hewlett et al. 2013; Walter 2014.
- 16 LinkedIn 2014.
- 17 Elance-oDesk 2014.
- 18 Elance 2013.
- 19 Etro 2009, p. 191.
- 20 Thakkar 2014.
- 21 UN Women 2014.
- 22 Wu et al. 2014.
- 23 GitHub 2014.
- 24 Nottebohm et al. 2012.
- 25 Mahboob 2014.
- 26 Best and Rehman 2014.
- 27 Ashoka Changemakers 2014.
- 28 Gathege and Mora 2013.
- 29 Friederici 2014.
- 30 de Bastion 2013.
- 31 Internet Society 2014.
- 32 See www.BRCK.com.
- 33 Heilbron 2013. For more information on MEST, see meltwater.org.
- 34 Nabong 2013.

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