

A low-angle photograph of a Colombian flag flying against a clear blue sky, with the upper corners of buildings visible. The flag features horizontal stripes of yellow, blue, and red. The buildings have terracotta roofs and balconies with plants.

THE COLOMBIAN TECH ECOSYSTEM

A Study of Connections among Entrepreneurs,
with Recommendations for Growth

a report from:



WORLD BANK GROUP

endeavor
INSIGHT



ABOUT THIS REPORT

This report was commissioned by the Colombian Ministry of ICT through an engagement with the World Bank to support and energize the country's public digital innovation environment. It is based on research conducted in coordination with (1) the Government of Colombia's Vice Ministry of IT, led by Vice Minister María Isabel Mejía, and in particular with the Gobierno en Línea team, (2) Apps.co, and (3) staff at the World Bank, including Hallie Applebaum, Henry Forero, Elena Gasol Ramos, Eva Clemente Miranda, Fabio Andres Montoya, Arturo Muelle Kunigami, Victor Mulas, Monica Peñuela, and Rocio Sanchez Viguera. The report was created by Matt Lerner and Rhett Morris of Endeavor Insight in January of 2016.

The project utilized a mixed methodology that combines direct surveys and interviews with entrepreneurship data drawn from external sources such as AngelList and CrunchBase. The survey sample is self-selected: all survey responses come from those who chose to provide information. As such, conclusions cannot be drawn from this data in the same fashion as might be done with a random sample. A detailed explanation of the research process can be found at the end of this document.

Thank you to the Government of Colombia's Gobierno en Línea, Apps.co, and the Vice Ministry of IT teams led by Vice Minister María Isabel Mejía for their support and cooperation during the research.

This project was conducted in association with the Global Entrepreneurship Research Network (GERN).

Introduction: The Tech Industry in Colombia

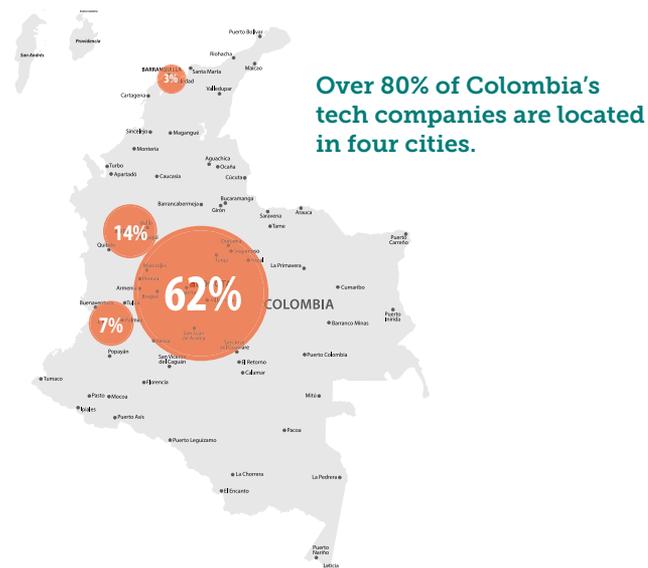
Entrepreneurship is an important driver of economic growth and social development. High-growth entrepreneurial companies are critical sources of innovation and employment. However, successful entrepreneurs do not arise in isolation. A supportive ecosystem that provides entrepreneurs with access to capital, talent, customers and other resources needed to grow their businesses is critical.

This report will investigate the ecosystem in Colombia that has arisen around the Information and Communications Technology (ICT) sector. Since 2010, this sector has become a topic of international conversation. Articles in the Wall Street Journal, TechCrunch, the Boston Globe and other publications have highlighted numerous examples of local Information and Communications Technology (ICT) firms. These companies leverage the Internet and other information technologies as a core part of their businesses; they include software companies, producers of novel digital hardware, and web-enabled innovations of conventional businesses.

Using a list of companies collected by Colombia's Information and Communications Technology (ICT) Ministry, Endeavor Insight was able to estimate the number of people employed by ICT firms in Colombia at 20,000; in reality, this figure could be much higher.* This is especially notable since data from Colombia's Ministry of IT (MINTIC) suggest that jobs in the ICT sector pay significantly more than the average national wage of US\$692 per month (PPP).¹ These 20,000 technology jobs do not include tech workers employed at non-ICT firms across the country, who also play vital roles in the national labor force.²

Data³ shows that technology companies are concentrated in Colombia's largest metropolitan areas. As Figure 1 illustrates, most of the country's tech firms can be found in two cities: Bogotá and Medellín. In fact, over 80 percent of the nation's tech businesses can be found in the top four most prominent local tech hubs, even though these four cities—Bogotá, Medellín, Barranquilla, and Cali—represent only a quarter of Colombia's total population.

Figure 1: Distribution of Technology Businesses across Colombia



*The research team based employment estimations on conservative interpretations of the MINTIC data, which was organized in categories such as "11-50 employees" and "51-200 employees." In these cases, the absolute low end of the range for each company (in this example, 11 and 51) was summed.

Analysis: Looking at the Colombian Tech Ecosystem

The growth of Colombia's tech sector can be seen in entrepreneurs like Alex Torrenegra, who leads the Bogotá-based Torrenegra Labs with his wife, Tania Zapata, and colleague, Leonardo Suárez Ruiz. Torrenegra Labs has created and grown more than 15 technology businesses, including several, such as Rentalo and wehostels, that have been acquired by larger firms.⁴

The impact of Torrenegra Labs is not limited to the number of companies it has launched. Through the relationships and activities of its founders, Torrenegra Labs has spawned an extensive network of other tech companies. In order to assess the full impact of founders like Alex Torrenegra, and to get a fuller picture of the kind of relationships that are driving the growth of Colombia's tech ecosystem, Endeavor Insight and the World Bank interviewed and surveyed nearly 1,200 Colombian tech founders and asked them a set of core questions:

- Who inspired you to become an entrepreneur?
- Who invested in your company? What companies did you invest in?
- Who was your mentor during the growth and development of your company? What other entrepreneurs have you mentored?
- Have you founded other Colombian tech companies? Who were your cofounders?
- Which of your former employees have gone on to found Colombia-based tech companies?

In addition, researchers collected data on the educational backgrounds of entrepreneurs in Colombia's tech sector, their participation in entrepreneurship and industry support programs, such as accelerators and hackathons, and their perceptions of public efforts to stimulate the national technology sector. This data was combined with additional data from sources such as CrunchBase and Mattermark and the aggregated dataset was compared with benchmarks from similar studies around the world conducted by institutions affiliated with the GERN initiative.

The results in this survey are based on data from those who responded to outreach efforts. The sample cannot conclusively be determined to be representative, and it would be misleading to draw conclusions from this group as if it were the whole ecosystem. For more information, please see the Methodology section.

These data was used to assess the broader impact of local companies. As Figure 2 illustrates, over 50 Colombian tech companies are connected to Torrenegra Labs: former employees have started new firms, as the founders of Torrenegra Labs have acted as mentors and investors, and local young people have been inspired by the partners' success.

Analysis: Constructing a National Tech Entrepreneurship Network

The example of Torrenegra Labs is not an isolated one. Many other technology firms in Colombia show evidence of these same connection types: their founders are mentoring, investing in, and inspiring the next generation of entrepreneurs.

Figure 3 on the following page shows the network map of connections across the Colombian tech companies that participated in this survey. The network, as determined by the relationships between companies that responded to the survey, is illustrated by examining the following four snapshots in time:

- **1998:** Only 47 companies can be seen in the network from this period with just 9 connections among them;
- **2007:** 149 ICT companies are founded leading up to this year. More than 63 connections exist among these firms and nearly every type of connection is included;
- **2012:** In five short years, the number of firms in this network grows substantially to reach 322 and all five connection types can be seen among them;
- **2015:** The number of firms in the network reaches 678. There are 628 connections among these companies including 21 percent mentorship relationships, 44 percent serial entrepreneurship, 21 percent former

employees creating new firms, 8 percent inspiration, and 4 percent angel investment.

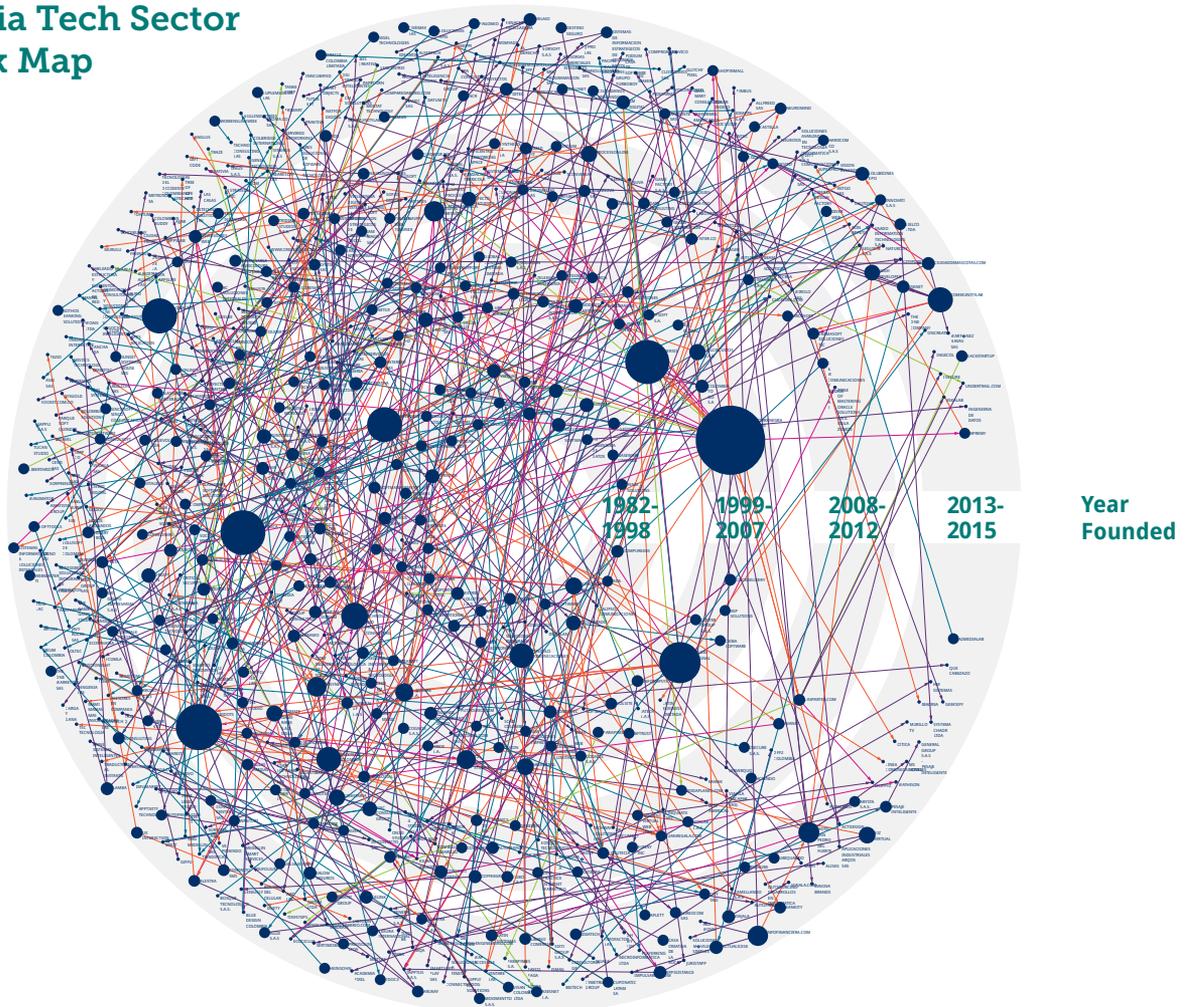
On the map in Figure 3, a company's influence⁵ is represented by the size of its bubble. Companies that have inspired, mentored or invested in more entrepreneurs are represented with larger blue bubbles that indicate their "centrality" to this network. These influential entrepreneurs can be seen at firms such as Torrenegra Labs, Fluid Signal and Intergrupo. Their connection to other entrepreneurs can be seen in the multicolored arrows that represent the interactions studied in this project.

During the five years from 2010 to 2014 (inclusive), the number of companies connecting into this network has grown by 15 percent annually, on average. Data from 2015 indicate that the rate of growth in 2015 is likely to exceed this average.⁶

During the time frame in which the Colombian tech network grew at 15 percent, the job creation of the companies in this network was increasing at an even faster rate. From 2010 through 2014, these companies increased their total employment by over 20 percent annually, on average.⁷

Figure 3: Network Maps of Colombia's Tech Sector

Colombia Tech Sector Network Map

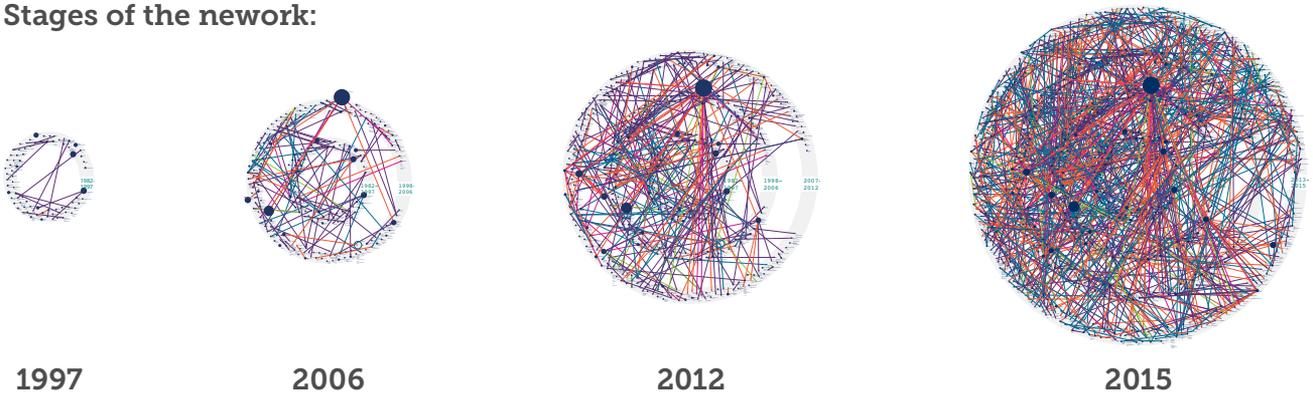


Legend:

 Size of circle reflects the influence of the entrepreneurs at each company based on their number of outgoing connections.

-  MENTORSHIP
-  INSPIRATION
-  INVESTMENT
-  FORMER EMPLOYEE
-  SERIAL ENTREPRENEURSHIP

Stages of the network:



1997

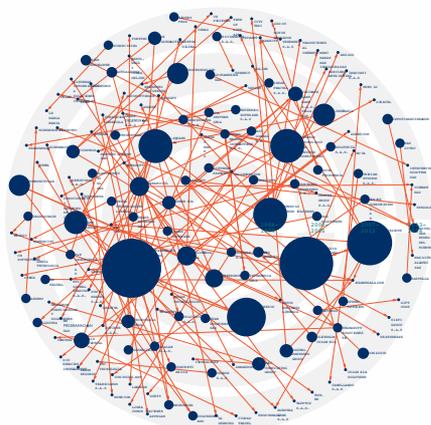
2006

2012

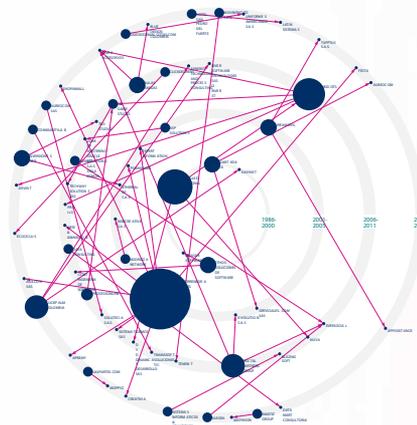
2015

The Colombian Tech Network by Connection Type

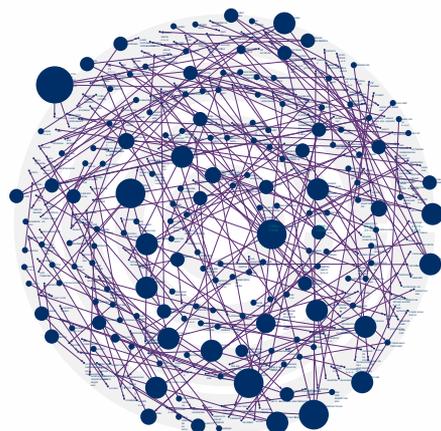
Figure 3 (cont): The Colombian Tech Network by Connection Type



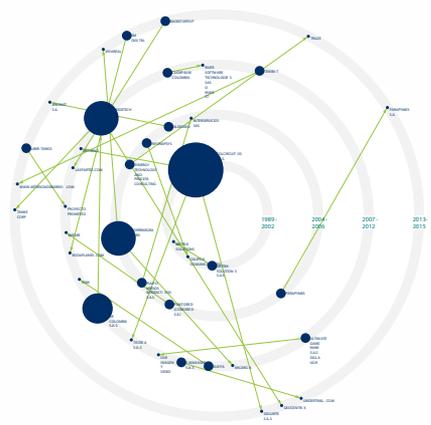
Mentorship



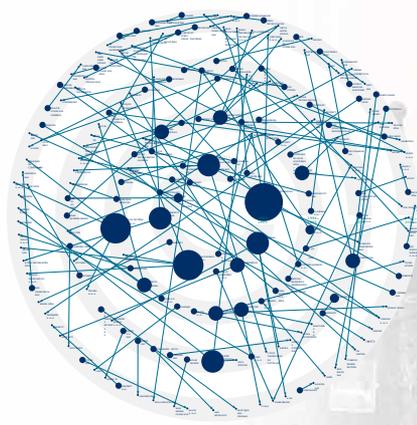
Inspiration



Serial Entrepreneurship



Angel Investment



Former Employee Spinouts



Analysis: Examining Connectivity Growth among Colombian Tech Founders

The individual types of connections illustrated on the previous page—mentorship, investment, inspiration, serial entrepreneurship, and employee spinouts—have increased significantly over the past five years (see Figure 4).

- **Serial entrepreneurship:** Founders starting their second, third, fourth, or even fifth technology companies represented almost half of the total connections among Colombian tech entrepreneurs and their companies.
- **Former employee spinouts:** Employees leaving technology businesses to become entrepreneurs themselves made up more than a fifth of the total connections in the network identified for this study.
- **Mentorship:** Founders who serve as mentors for other founders are about as prevalent as employee spinouts. These types of interactions have also grown over the past half-decade.
- **Inspiration:** Many Colombian tech entrepreneurs also reported that they were inspired by their fellow citizens in the tech industry. In fact, examples of inspiration make up 8 percent of the connections in the network studied in this project.
- **Investment:** Angel or venture capital investments among founders were the least common type of interaction tracked in this study. Only 4 percent of the interactions among tech founders were investments.

Figure 4: Connectivity Growth among Colombian Tech Founders

The number of connections between Colombian tech firms has grown along with the number of companies in the network.

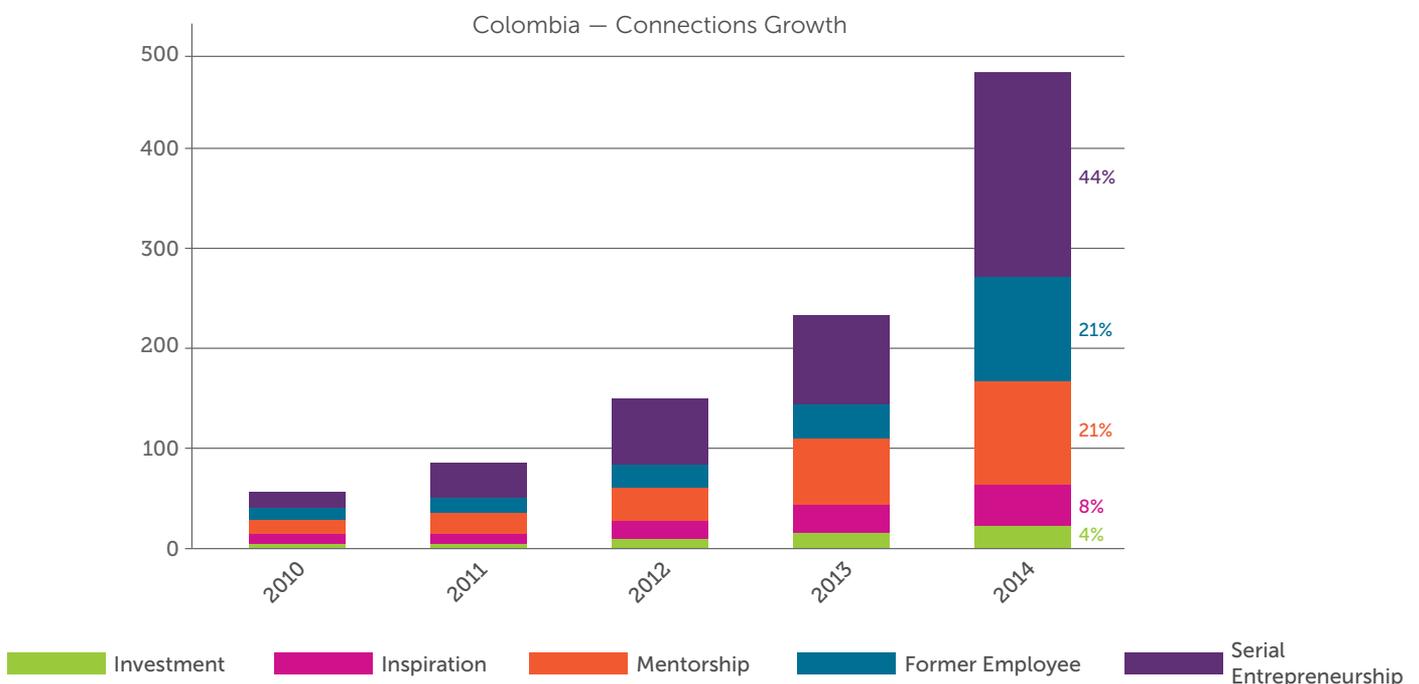
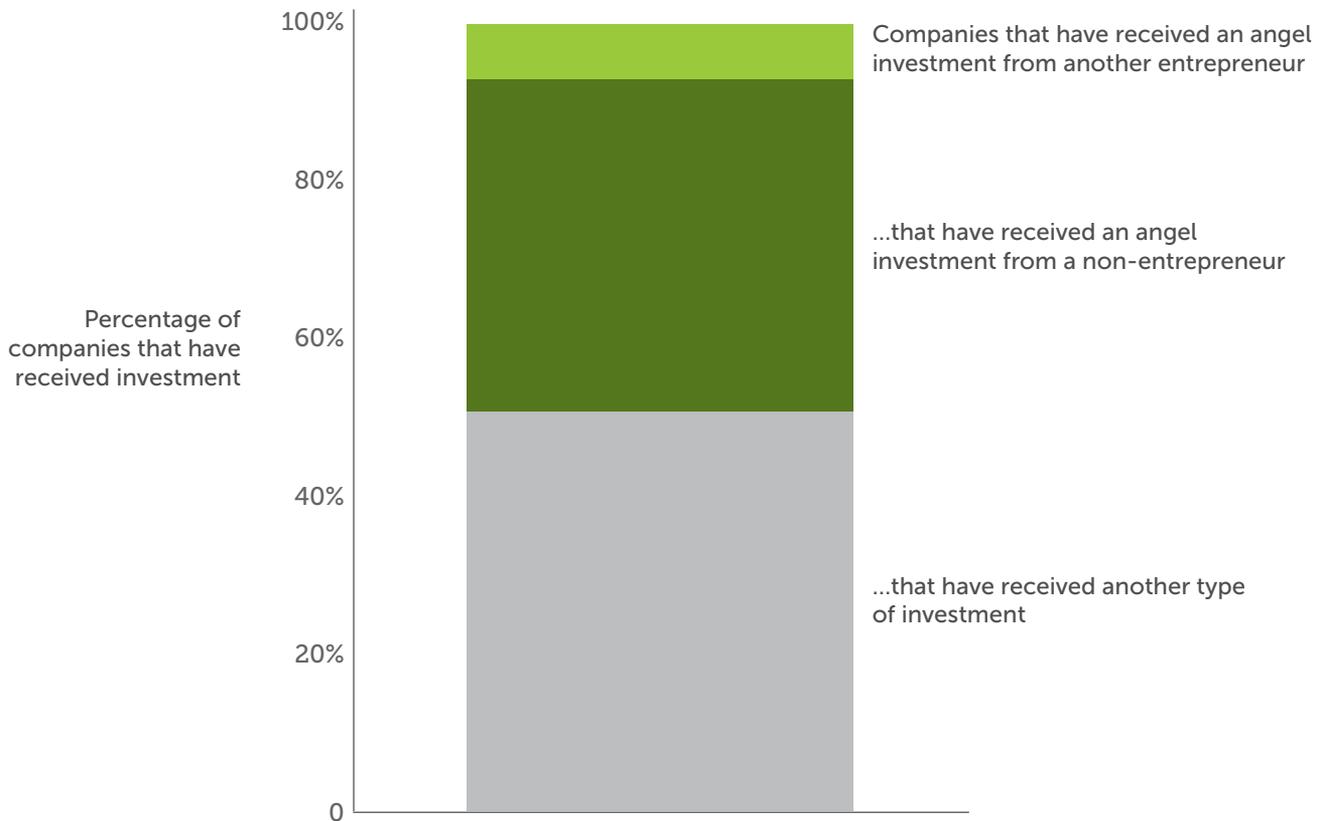


Figure 5: Types of investment in Colombian tech companies

While Colombian tech entrepreneurs do receive angel investment, very little of it is “smart money” that comes from other tech entrepreneurs.



It is important to note that these connections are predominantly found among entrepreneurs in the same city. Approximately 75 percent of the interactions occurred between founders in the same city, with most of these relationships developing between pairs of founders in Bogotá and between pairs of founders in Medellín.

The survey results indicate that 80 percent of inter-city interactions between entrepreneurs involved either Medellín or Bogotá. Only 20 percent of connections take place outside of Colombia's two tech entrepreneurship hubs, making it clear that the two cities are central

and indispensable to the tech industry in Colombia.

The continued growth in connections over the course of the last five years indicates a bright future ahead, but there are still opportunities for improvement. Endeavor Insight's analysis took a closer look at the top 30 tech companies in the network in terms of employment. All of these companies have some type of connection, but only 15 percent of the founders of these companies have mentored another entrepreneur in the network, and only four founders have made an angel investment in another tech company.

These are the entrepreneurs who can make the greatest difference by deploying their capital and expertise to help other founders succeed as they have—by building valuable companies, creating innovative technologies, and creating hundreds or even thousands of jobs.

Additionally, there is one type of connection that has not grown at the same rate as the other relationships tracked in the research. This is angel investment, in this case defined as a scenario in which the founder of a Colombian tech company makes an individual investment in another such firm. Not only do these types of connections represent only 4 percent of relationships on the map, but they have also failed to grow at a rate matching that of the other connection types that were tracked. Colombian tech founders are simply not investing in each other.

This does not mean that there is no angel investment happening in Colombia. On the contrary, about half of the founders who received investment had received an individual invest-

ment of some kind or other. However, the vast majority of this funding does not seem to be coming from other entrepreneurs. In fact, when asked how founders came into contact with their investors—in other words, how investment connections were “mediated”—the most common response was that these relationships were mediated through friends, family, or other types of personal relationships.

The data also shows that fewer than 10% of Colombian tech firms have received an institutional investment such as an injection of funds from a venture capital firm. It’s instructive to compare both angel investment and institutional investment research results with similar data from a past project conducted in New York (see figures 5 and 6), along with angel investment in the larger context of overall connections growth. Compared with a similar time period in New York, the growth of angel investment in Colombia over the past five years has been slow.

Figure 6: Comparison with NYC – Institutional Investments

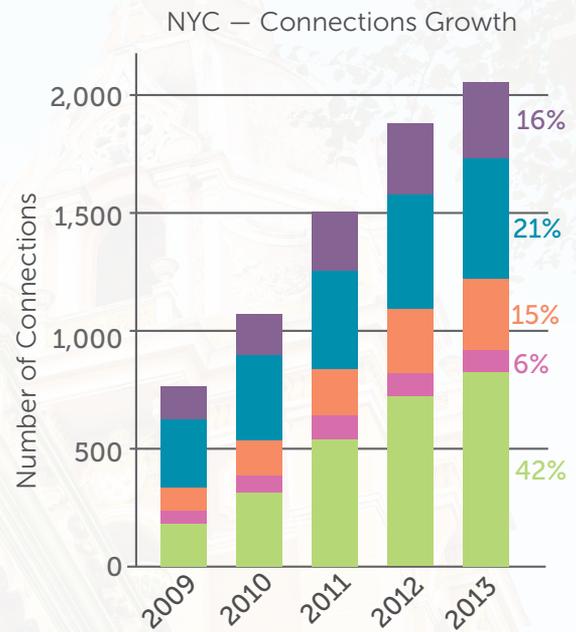
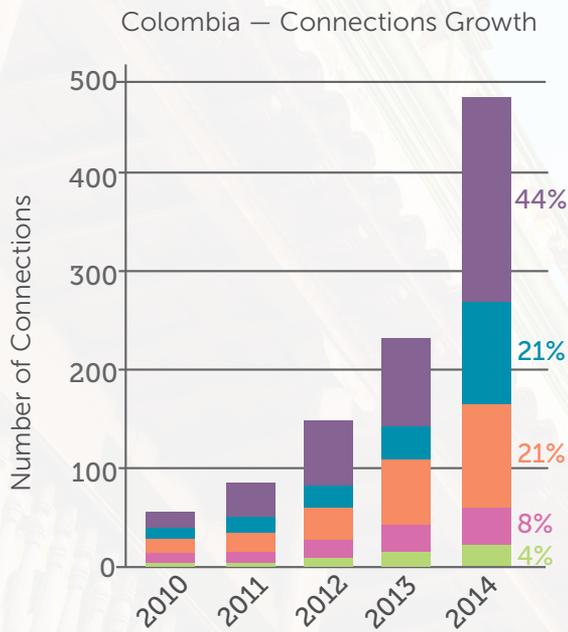
Additionally, Colombian companies are far less likely to receive funding from institutional investors like venture capitalists.

Colombia:
<1 in 10
 companies received an institutional investment (e.g. venture capital)
 \$\$\$\$

NYC:
>5 in 10
 companies received an institutional investment (e.g. venture capital)
 \$\$\$\$\$\$

Figure 6 (continued): Comparison with NYC — Connections Growth

How does Colombia's ecosystem compare with New York City's?



- Investment
- Mentorship
- Serial Entrepreneurship
- Inspiration
- Former Employee Spinouts

Analysis: What Are the Typical Paths of Colombia's Tech Founders?

As Figure 7 illustrates, the founders connected into the network started their first companies at a wide variety of ages. A majority of founders got started in their twenties, with the largest group embarking on an initial venture between the ages of 27 and 32. Given the common view of tech entrepreneurs as prodigies who start ventures from their college dorm rooms, this might be surprising. Nearly a third of founders do not move seamlessly from university into entrepreneurship; instead, they embark on professional careers and use the skills they learn in business when they strike out on their own. This is congruent with what the survey revealed about former employee spinouts, which are a major component of Colombia's growing tech ecosystem.

Still, nearly a fifth of first-time founders are under twenty, and many more are college-aged. Colombia's universities excel at nurturing tech talent. When founders were asked how they came into contact with their mentors, the most common response by far was that they met at university. In addition to mediating important connections, however, a small group of universities is also actively training the next generation of entrepreneurs.

Five local universities—Universidad de los Andes, Universidad EAFIT, Universidad Nacional de Colombia, Universidad Pontificia Bolivariana, and Universidad de Antioquia—are also re-

sponsible for graduating nearly 30 percent of the local tech founders at the undergraduate level. Data on the relative contribution of each university, based on the responses of the entrepreneurs who supplied education information, can be found in Figure 8.

In addition to local universities, Colombian tech entrepreneurs often take part in programs and organizations designed to support the local technology industry or entrepreneurship as a whole. The eight most prominent organizations touched about one in every 12 tech businesses in the network studied for this project. These most influential national and local organizations and programs include Apps.co, INNpulsa, ParqueE, Creame, Ruta N, Wayra, Cultura E, and NXTP Labs. The relative influence of these organizations and programs is shown in Figure 9.

Many mentoring connections (almost 10% of connections for which this data was supplied*) found in the study came from relationships mediated by or established at universities. Additional mentoring connections came from founders' personal networks (6%), which were also critical for entrepreneurs who raised investment (18% of connections†). Inspiration frequently (12% of connections‡) came from media encountered on the Internet by founders in the study.

* 538 mentorship connections
 † 245 investment connections
 ‡ 350 inspiration connections

Figure 7: Demographic Information about Colombia's Tech Founders

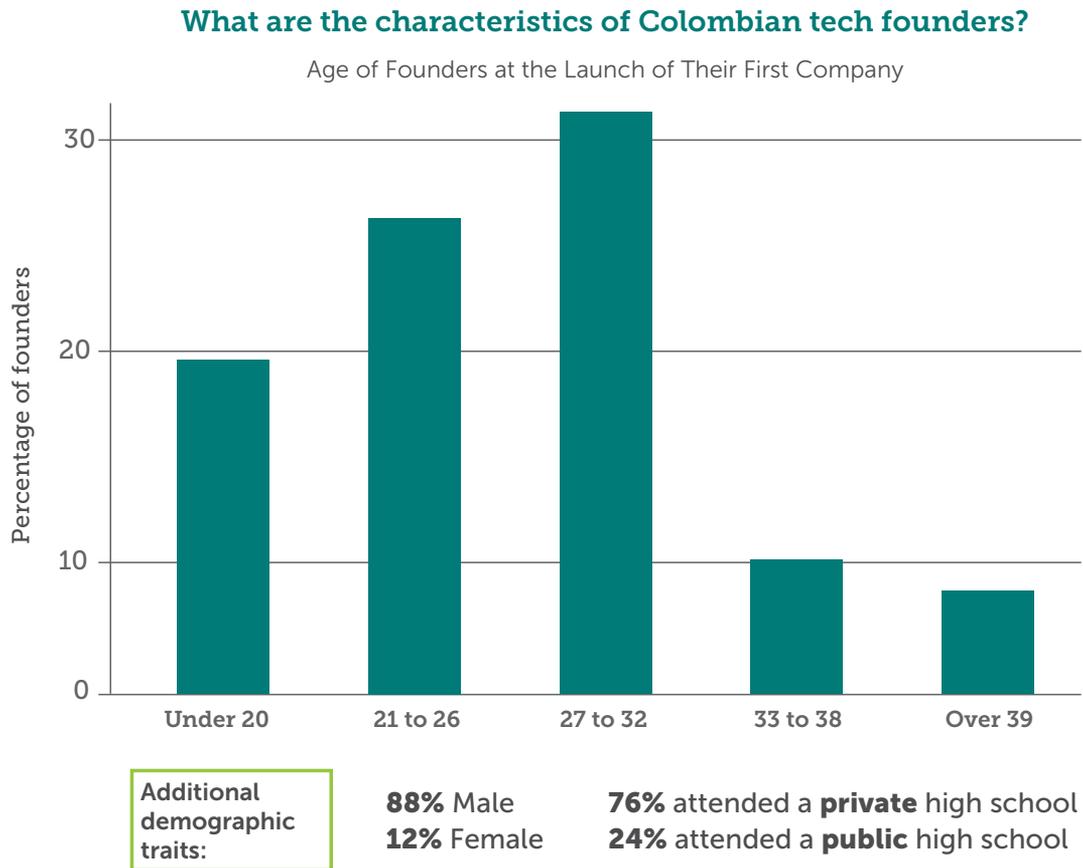


Figure 8: Most Common Undergraduate Universities of Colombia's Tech Founders



Note: 73 percent of respondents who provided educational information reported that they attended institutions other than those listed above.

Figure 9: Most Influential Entrepreneurship Support Programs and Organizations among Technology Founders

What support programs are serving Colombian tech entrepreneurs?

Support programs in which Colombia tech companies participated (by percentage of companies participating)

1) **Apps.co**

2) **innpuls**
Colombia

7% of companies in the network utilized one or more of these resources

3) **Parque E**
ALCALDÍA DE MEDELLÍN - UNIVERSIDAD DE ANTIOQUIA

4) **creame**
Incubadora de Empresas

rutaⁿ
MEDELLÍN
CENTRO DE INNOVACIÓN Y NEGOCIOS

wayra.

5) **cultura E**
Hacer empresa, qué buen negocio

>Nxtp.Labs

Note: 77 percent of respondents did not report participating in any support programs. The survey instrument for this project was also distributed with the assistance of Apps.co, Ruta N, innpuls, npt, Velum Ventures, and the Chamber of Commerce in Cali (Cámara de Comercio Cali).

What do founders think about the tech ecosystem?

In addition to gathering information about respondents' professional histories and asking questions about connections like mentorship, inspiration and investment, the survey also asked Colombian tech founders how they interact with the country's broader tech ecosystem. This question was included to supplement connections data with qualitative information that can help to contextualize the study's results. By parsing the thoughts and opinions of hundreds of Colombian tech entrepreneurs, it is possible to gain important insight into the challenges and opportunities they face every day.

Many entrepreneurs mentioned the numerous support programs, both government-sponsored and otherwise, that now exist to support entrepreneurship in Colombia. They emphasized the creativity of Colombian entrepreneurs and the myriad opportunities that exist to grow the ecosystem and create a global tech hub. One entrepreneur described Colombia as a "co-working society." Another said Colombia has a "dynamic and versatile" tech ecosystem that "adapts to the needs of entrepreneurs." Another said that, in Colombia, "there is an innovative spirit; the young people are thinking about creating new things and recent graduates are focused on creating companies."

In keeping with the other results, entrepreneurs were candid about the tech ecosystem's weaknesses. They cited a lack of access to investment, markets, and consumers above most other factors. One entrepreneur said that it's necessary "to change the mentality of Colombian businessmen, so that they see that technology is an investment and not an expense." Another entrepreneur highlighted a lack of growth capital: "There needs to be better development of the venture capital industry, which today is practically nonexistent, so that companies have a real opportunity to take the leap— otherwise, only small and medium enterprises will be produced. We have to aspire to produce unicorns."

Entrepreneurs' comments are borne out by the other parts of the survey, which validate their views of the ecosystem's strengths and weaknesses. As Colombia's tech ecosystem continues to grow, it will be important to continue to take into account the needs of these key stakeholders—the entrepreneurs themselves—in order to better serve them in the future. Word clouds featuring some of the words used by entrepreneurs to describe the ecosystem can be seen in Figures 10 and 11.

Analysis: Strengths of Colombia's Tech Sector

Over the past five years, both public and private efforts to support tech entrepreneurship have grown in number and scale. At the same time, tech-focused entrepreneurial activity independent of these efforts has also expanded, as has regional and international interest in Colombia's entrepreneurial tech sector. The sector continues to grow. The network of companies analyzed here—a cohort of 678 firms with some type of connection to another tech firm—has increased by 15 percent annually during the last several years. In particular, the network has experienced a rise in serial entrepreneurship, in which one entrepreneur starts multiple companies, and in former employee spinouts, when employees of a tech company leave to start their own ventures.

It is no exaggeration to say that these two connection types are driving the growth of the ecosystem. In fact, a full 18 percent of firms in the ecosystem were founded by former employees of other Colombian tech firms, and 60 percent were founded by serial entrepreneurs. There is some small overlap between these categories, but in sum, 70 percent of companies in the network were founded by either former employees or serial entrepreneurship.

These are heartening signs. They indicate that young Colombians who gain experience working in the tech sector feel confident in starting their own ventures. This is borne out by data about the ages of first-time founders, a third of whom started their first company between the ages of 27 and 32. These entrepreneurs are well-prepared by local universities. A third of founders were educated at one of five top Colombian colleges, and the data reveals that many were students of engineering, computer science, or other technical fields.

For the roughly one in five founders who start

companies during their college years, universities are also proving valuable: they were the most frequent locale in which founders met their mentors and, as previous projects have concluded, mentorship is a valuable driver of future success.

That success is also being enthusiastically nurtured by a constellation of support organizations, incubators and accelerators, many of which receive direct government support.⁸ Government-sponsored programs like INNpulsa and Apps.co show up again and again in the data. This wealth of early-stage support is vital for startups looking to get off the ground, and as a venue for forming connections. In fact, the second-most common mediator for mentorship connections was SocialAtom Ventures, a fund founded by Andres Barreto that also manages Atom House, a co-working space for entrepreneurs.

Entrepreneurship is drawing an ever-larger number of young Colombians. A look at the age breakdown of the founders who were interviewed reveals that fewer than 20 percent of first-time founders are over 33, and nearly half are under 25. As this trend continues, the ecosystem promises to increase in size and impact in the near future.

When asked what they perceived to be the tech sector's strengths, survey respondents communicated a keen awareness of all that the ecosystem has going for it, as well as a high degree of enthusiasm for the future—all using highly positive language. A word cloud visualizing some of these responses can be seen in Figure 10.

Figure 10: Entrepreneurs' Views of the Ecosystem's Strengths

¿Cuáles son las fortalezas del ecosistema de innovación en Colombia?



Analysis: Major Challenges Facing Colombia's Tech Industry

As Colombia's tech sector continues to grow rapidly, it has the potential to become a powerful engine for sustained economic growth. In order to maintain this growth, however, the sector's weaknesses will need to be addressed.

Angel investment between entrepreneurs—or “smart money”—is an important predictor of success⁹ for several reasons. Smart money is more than capital. Angel-entrepreneurs have the necessary experience to take an active role in guiding the companies in which they invest, and their advice is likely to be heeded not just because they are experienced, but also because they have equity. Angel investors without previous industry experience are unable to provide these valuable, non-monetary resources.

Endeavor Insight has studied entrepreneurship ecosystems in dozens of cities on multiple continents and has found several commonalities between tech sectors at similar stages of growth and success. One important factor of successful ecosystems is the existence and continued growth of high levels of angel investment between entrepreneurs. In New York, Endeavor Insight found that tech companies that had received an angel investment from a top-performing tech entrepreneur were twice as likely to become top performers than companies that had not received such investment.¹⁰ This is a phenomenon that is not present with respect to angel investments received from family, friends or personal connections. In Colombia, Insight found that a large number of investment connections were made in this fashion. Based on previous research, this is a weakness.

Additionally, experienced investors who become angels or venture capitalists are more successful investors than non-entrepreneurs.

The companies they invest in are more likely to become successful—as measured by employment or valuation—than the companies picked by non-entrepreneur angels. This has major consequences for the growth of an ecosystem. If more entrepreneurs become angel investors, then a greater portion of investors become successful, and this means that more money flows to more successful companies. Inter-entrepreneur angel investment is therefore an important means by which entrepreneurship ecosystems nurture greater numbers of companies that will create value by employing people, innovating, and drawing capital to their home cities.

The existence of successful firms is an important catalyst of ecosystem growth.¹¹ Aspiring local entrepreneurs must be convinced of the viability of entrepreneurship before committing to it as a career path. Starting a business is a wholly consuming endeavor, and rewards need to be clear in order to induce large numbers of young people to undertake it. But rewards can differ from country to country, and sometimes even from city to city, so the wild success of entrepreneurs a continent away may not be enough to spur young Colombians into starting their own ventures. Local inspirations are important. Raising the profiles of successful founders can go a long way toward convincing Colombian youth that the potential for success as an entrepreneur is huge.

Throughout the survey, participants identified a few entrepreneurial success stories central to the ecosystem. Alex Torrenegra and Andres Barreto¹² are two such influential actors. However, there are not yet enough to propel Colombia's tech ecosystem into the future. When asked who inspired them to become entrepreneurs, many founders who responded to the survey listed universally-recognized names like

Steve Jobs or Bill Gates. These successes are now so well-known as to be almost mythical. Potential entrepreneurs need role models who are closer to home, who can demonstrate that large, real, and lasting success in Colombia is plausible.

Prominent entrepreneurs in nascent ecosystems commonly leave for more developed ecosystems that can offer better funding or mentorship opportunities. For example, entrepreneurs might leave Paris for London; London entrepreneurs in turn might leave for New York or San Francisco. The drain of entrepreneurial talent from an ecosystem represents a drain in opportunity and growth potential and, in the case of tech, negatively impacts the sector's future growth. While many countries and cities are creating visas and programs to lure talented entrepreneurs to their ecosystems,¹³ it is important to think about how a developing ecosystem can retain its talent. This is why it is also important to keep successful Colombian entrepreneurs in-country, involved in the Colombian tech sector, starting new companies and mentoring younger entrepreneurs. Some of the more successful entrepreneurs that Endeavor Insight researched over the course of this project maintain transnational operations, with offices, for example, in both Bogotá and San Francisco. This is positive for them, but there exists the threat that they could close down the Colombian sides of their businesses and relocate permanently to the U.S. or elsewhere.

One way to avoid this eventuality—and to maximize success in the network—is to work to engage successful founders on a continuing basis. A deeper look at the founders of the thirty largest companies by employment in Colombia's network reveals that 15 percent have

mentored another founder. This is a weakness. In New York, Endeavor Insight found that a mentorship connection from a top-performing founder nearly tripled a company's chances of success. But it is also an opportunity— by engaging the other 85 percent of these top-performing founders, it is possible to vastly accelerate the growth of the ecosystem, magnify the number of successes, and in the process keep these successful entrepreneurs engaged and involved in their local ecosystem.

Entrepreneurs themselves have the best view of the ecosystem's weaknesses. Interestingly, some of the most commonly cited weaknesses mentioned by entrepreneurs were listed as strengths by others. One possible takeaway from this result is that the benefits of the ecosystem are not being distributed equally. While some founders see a wealth of support, others feel that substantially more is needed. A word cloud identifying some of the weaknesses listed by founders appears in Figure 11.

Figure 11: Entrepreneurs' Views of the Ecosystem's Weaknesses

¿Cuáles son los retos del ecosistema de innovación en Colombia?



Lastly, the research team noted a lack of later-stage support for Colombian tech companies. This includes capital as well as non-financial support. While there are many incubators and accelerators in Colombia, they are largely focused on startups. The same is true of capital, which tends to be focused on early-stage companies. In Colombia, however, 8 percent of companies are responsible for 45 percent of jobs.¹⁴ In order for startups to scale to become

part of this elite group of job-creating firms, they will need capital and support beyond their initial stages. When asked about the weaknesses and challenges in the ecosystem, entrepreneurs noted that access to markets, customers and investment pose obstacles as their companies grow. Later-stage support programs can help entrepreneurs address these problems and help to communicate their needs to other public and private stakeholders.



Conclusion: Looking Forward to a Bright Future for Colombia Tech

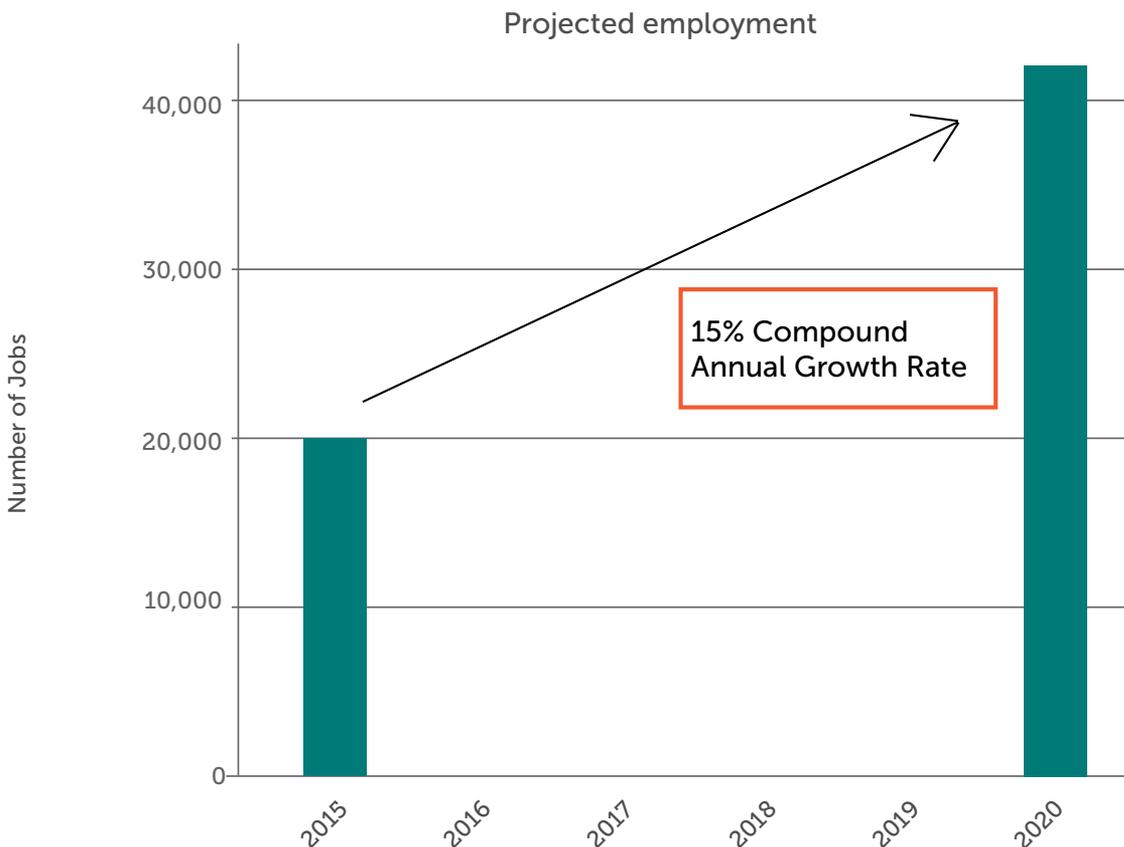
Tech companies in Colombia currently employ an estimated 20,000 people. This talent is largely concentrated in a few large cities, and the vast majority of connections between entrepreneurs involve either Bogotá or Medellín. In recent years, however, the density and number of these relationships has begun to rapidly increase.

This is thanks, in part, to the efforts of the Colombian government to support and promote

entrepreneurship in concert with the initiative and energy of Colombian entrepreneurs themselves. The recent uptick in entrepreneurial activity has produced an ecosystem that is now growing at a rate of 15 percent annually. If the sector as a whole continues to grow at this rate, it will, by 2020, employ twice as many people as it currently does.¹⁵

Figure 12: Projected Employment Growth of Network Companies through 2020

Looking forward: If Colombia's whole tech sector continues to grow as fast as its network of interconnected companies, it will quickly double in size:



METHODOLOGY

Data for this research was collected during 2015 using surveys, primary interviews with entrepreneurs and publicly available data from CrunchBase, Angellist, and Mattermark. Endeavor Insight's working definition of a tech company is one that is either actively developing a new information technology or one businesses are Internet-enabled. For this project, Insight began with a starting data set supplied by the Colombian government's Ministry of Information and Communications Technology (MINTIC). Entrepreneurs contacted by utilizing this list were designated as technology entrepreneurs, and their companies were target as such. After excluding multinational corporations, Endeavor Insight also combed through "untargeted" companies (e.g. those not found on the MINTIC list and/or those not founded by founders who started companies on the MINTIC list) and included them in the research if they met the above criteria defining tech companies.

Researchers used a MINTIC database containing approximately 8000 companies as a basis for outreach efforts. In total, 1190 entrepreneurs were surveyed or interviewed to produce a map featuring 678 Colombian tech companies. They were asked the following core questions:

- Where were you employed before starting your company/companies?
- Who inspired you to become an entrepreneur?
- Who invested in your company?
- What companies have you invested in?
- Who was your mentor during the growth and development of your company?
- What other Colombian tech founders have you mentored?

- Have you founded other Colombian tech companies? If you had cofounders, who were they?
- Which of your former employees have gone on to found Colombia tech companies?

In addition, founders were asked a battery of additional questions designed to accumulate information about their backgrounds and characteristics.

Responses to the core questions to create an edgelist of connections among companies, along with a corresponding set of five outbound connection types, each of which is represented by a different colored arrow. Where an entrepreneur has founded multiple companies, his or her most prominent company (based on an index of founding date, number of employees, total investment, and exit sizes) represents his or her influence on the map. Companies are oftentimes connected by more than one type of connection. Where a purple "founder" arrow connects any two companies, the only other arrow that can appear is the blue "former employee" arrow. Likewise, where mentorship and investment occur simultaneously between two companies and their entrepreneurs, only the green investment arrow is included. In the former case, it is assumed that inspiration, mentorship, and investment are encompassed within the act of serial entrepreneurship represented by the purple arrow. In the latter, it is assumed that angel investment comes with a degree of mentorship. Otherwise, multiple arrows can connect two companies.

The size of a company's circle is based on directed closeness centrality for unconnected graphs. In layman's terms, the size of a company is a function of the number of first-, second-, third-, etc. degree connections the company and its entrepreneurs have to others in the net-

work. Each ring represents a time period and companies are located on a ring according to the year they were founded. Connections accrue to a company based on the time period in which the connections occurred. Where the year a connection occurred is unknown, Insight takes one of two different approaches. Where there is no year information for an inspiration, former employee, investment, or founder connection, it is assumed that the year of the connection between the source and the target companies is equal to the year the target company was founded. To estimate when a mentorship relationship started where a start year

is lacking, Insight reviews mentorship relationships where there is start year information and estimates based on this data.

This project was conducted in association with the Global Entrepreneurship Research Network (GERN). Data collected in conjunction with previous GERN projects supported by the Inter-American Development Bank and the JP-Morgan Chase Foundation was utilized in the analysis, in addition to data from projects conducted independently by Endeavor Insight and a recent study in Medellín conducted in collaboration with the World Bank.

ENDNOTES

1. "Where are you on the global pay scale?" BBC News. 29 March 2012. <<http://www.bbc.com/news/magazine-17543356>> — Based on last official ILO estimate; "Estudio de Salarios del Sector TI en Colombia 2013" MinTIC - IDC. 2013.
2. Endeavor Insight used the list provided by MINTIC. Any job at a tech company on this list is thus defined as a "tech job," since the existence of the position is predicated on the existence of a given ICT company.
3. Endeavor Insight analysis
4. <http://www.torrenegralabs.com>
5. Influence is measured by closeness centrality, a common graph-theoretic metric based on a node's total number of connections, as weighted by distance (e.g. two degrees, three degrees, etc.) from the origin node.
6. Data was collected through the beginning of the fourth quarter of 2015. Since data from all previous years was complete, analysis focused on the years for which end-of-year data was collected. Informal analysis of 2015 data confirms continued growth but, since year-end numbers are unavailable, is necessarily an estimate.
7. Entrepreneurs were asked for their employment information over the course of the five years 2010-2014 (inclusive). Not all respondents responded to the survey in its entirety, and not all companies had a founder who the research team was able to survey or interview. Insight took the cohort of companies with complete data and calculated median employment numbers for each year, then imputed these numbers for companies with no employment data whatsoever. A CAGR was then calculated for this current data set before bringing in companies for which only 2014 data was available. The calculated CAGR was used to estimate and impute pre-2014 employment numbers for these companies. A final employment CAGR was then calculated for the full data set in its entirety.
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13. For example, the U.S. O1 Visa (<http://www.uscis.gov/working-united-states/temporary-workers/o-1-visa-individuals-extraordinary-ability-or-achievement>) or the so-called French Tech Ticket (<http://www.frenchtechticket.paris/>)
14. Endeavor Insight. "The 8-45 Report: Why Scaleup Companies are Critical for Job Creation in Colombia." <<http://www.endeavor.org/insight/endeavor-insight-releases-the-8-45-report-focused-on-scaleup-companies-in-colombia/>>
15. Endeavor Insight Analysis



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March 2016
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