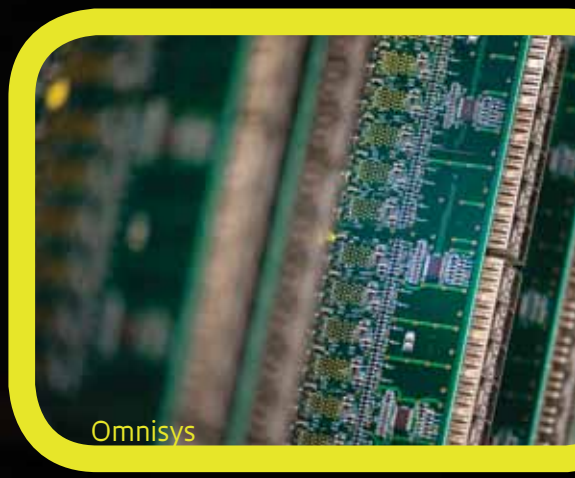
São Paulo innovation showcase: technological devices developed by start-ups


Omnisys

NEW BLOOD IN INNOVATION

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Start-ups gain recognition and consolidate collaborations with the public sector and large companies


CI&T

In at atmosphere that could be described as almost festive, with the participation of many young businessmen wearing suit jackets over t-shirts and blue jeans, a ceremony in the at Bandeirantes Palace, the seat of the São Paulo State government, marked one of the most recent and effusive acts of recognition of the creative and economic potential of start-up companies with innovative products. On that day, November 17, 2015, the 15 companies selected from more than 300 candidates in the first Pitch Gov SP competition were announced. They had developed products—mostly computer programs—capable of facilitating public administration and citizen access to medical or educational information managed by public agencies. The recognition and growth of start-ups in Brazil indicate that a new reality in the field of technology development is forming in the country, decades after the many small creative companies in Silicon Valley showed that they can be very lucrative and even compete with large enterprises.

One of the companies selected by Pitch Gov, Dev Tecnologia—a São Paulo company also selected for a creative business program promoted by the multinational company Samsung—developed software that reduces consumption of water and power. Another finalist, Aime, is a partnership between the non-governmental organization Viva Rio, from Rio de Janeiro, and Singularity University, in California, and offers a program with artificial intelligence resources to predict areas in which dengue fever and other diseases such as cholera and tuberculosis will occur, three months in advance and with an accuracy of 88%, according to tests carried out in Malaysia. AppProva, from Belo Horizonte, and ClassApp, from Limeira, São Paulo State, also selected in the competition, developed applications designed to facilitate the work of teachers and students and communication between them and the students' parents.

Now, the 15 companies selected will test their products in public institutions and, in March 2016, will publicly present the initial results of the collaborations. In the next stage, the government will examine the possibility of incorporating or purchasing the successful projects. "The value of Pitch Gov is strategic, not financial," says Guilherme Junqueira, executive manager of the Brazilian Start-Up Association (ABStartups), which took part in developing the program promoted by the São Paulo government based on a similar experiment with large companies, Pitch Corp, begun in 2013 in Belo Horizonte. Junqueira says he has already been approached by government representatives from four states that would like to implement programs similar to that held in São Paulo. "I am sure that Pitch Gov will strengthen the start-ups in our state," said São Paulo Governor Geraldo Alckmin when introducing the companies.

Two weeks earlier, 10 start-ups, also in São Paulo, presented their products to potential investors in a meeting sponsored by the Start-Up Brazil program, an initiative of the Ministry of Science, Technology and Innovation (MCTI). According to Felipe Lemos Sereno, one of the program coordinators, in two years, the Ministry has invested R$27 million in the first 94 of the 183 companies selected which, in turn, have managed to obtain R$57 million from private investors. Also in November 2015, the Amazonas State government announced a program to encourage the formation and growth of technology companies, and the Federation of Industries of the State of São Paulo (Fiesp) presented the companies selected in the 7th Acelera Startup competition. Begun in 2011, this event has already brought in investments of R$5 million for the 350 companies selected who, through actions of this type, were given the opportunity to promote what they do.

Shortly afterwards, on December 9, 2015, FAPESP announced the 46 projects approved in the third call for proposals of 2015 for the Innovative Research in Small Businesses Program (PIPE). "In 2015, PIPE celebrated its 18th year and continues to expand into various regions in the state of São Paulo. This decentralization, arising from partnerships signed with industry, as well as from the maturing of the chain involved in the innovation process, is evidence of the potential of the state of São Paulo in this field," said Scientific Director Carlos Henrique de Brito Cruz when announcing the companies selected, 11 of which had yet to set up a legal entity. PIPE was a pioneering program established by FAPESP in 1997 to support research in science and technology and business development, and increase the competitiveness of small and medium-sized companies. Since then, 1,461 projects have been funded, 25% of which were start-ups, at a total cost of about R$180 million. The page www.fapesp.br/pipe summarizes information about the program and links to reports on the companies, published in *Pesquisa FAPESP* and *Agência FAPESP*.

Mat with built-in sensor and chip (*below*) and barcode reader (*facing page*): InfoPrice's innovations that are attracting the interest of supermarket chains

CHALLENGES AND REWARDS

Like an army of reserves finally called into action, start-ups are being invited to solve government and corporate problems more frequently. A good example is I.System of Campinas, which received an award in November 2015 from the Brazil-Germany Trade and Industry Board of São Paulo. It took off when, in 2010, it solved the problem of instability when filling Coca-Cola bottles. "We

Today, innovation comes mostly from start-ups, which are more creative and agile than large companies

knew about this problem and presented a solution," says Igor Santiago, one of the founders of the company that developed industrial control software to reduce water and energy consumption and increase productivity. "Our proposal was ambitious from the start: design industrial control systems better than those of multinational companies. One of the first challenges was to show what we were able to do."

On another research front, with the support of PIPE, Santiago and his associates — two other computer engineers and a mathematician who studied at the University of Campinas (Unicamp) — developed on-board systems to optimize home appliances and other equipment. Since 2013, the company, which currently has 25 employees, has received investments from the São Paulo Pitanga fund, which supports innovative companies with high growth potential (see *Pesquisa FAPESP* Issue No. 220).

In recent years, *Pesquisa FAPESP* has followed the innovations, advances and challenges of the São Paulo start-ups, such as I.Systems and Br-Photonics. The latter, founded in 2014 in the Center for Research and Development in Telecommunications (CPqD) will produce equipment for high-speed optical communications. Some technology companies that are strong now first passed through the start-up phase. This is the case of Padtec, one of the largest manufacturers of fiber-optic transmission equipment in Brazil. It passed through CPqD and Ci&T after being founded by three recently-graduated Unicamp computer engineering back in 1995. Today it is an international Brazilian company that works with corporate software and has 1,400 employees, all in Campinas.

Omnisys, in São Bernardo do Campo, started with three engineers in 1997 to produce and develop aeronautical and meteorological systems, including radar. Supported by PIPE and sold in 2006 to the French company Thales, it continues to develop research projects in Brazil. Some start-ups focus on agriculture, such as Promip, from the city of Engenheiro Coelho, in the Campinas metropolitan region, which also received support from PIPE and produces native bees for pollination and three species of predator mites that fight bugs that attack fruits and vegetables.

"In the 21st century, innovation comes mainly from start-ups because they are able to develop new products in shorter time frames and at lower costs, with more motivated teams than those of large companies," said Fabio Kon, professor at the University of São Paulo Institute

Israel's experiment

Proximity to universities and large companies and incentives for risk-taking and daring promote start-ups

After 35 interviews with the founders, directors and investors of 25 start-ups in Tel Aviv, Haifa and Jerusalem, Israel, from August to December 2013, Fabio Kon found that Israel has a relatively mature environment for supporting future entrepreneurs. There are centers of excellence in computer science, engineering, chemistry, physics and biotechnology—at Technion, at the Weizmann Science Institute, and at universities in Jerusalem and Tel Aviv, among others—and the research centers of multinational companies such as IBM, Microsoft, Google, HP and Intel in the Haifa and Tel Aviv regions, which promote the development of new products in start-ups. Another source of training for entrepreneurs are the Armed Forces institutes. In Israel, all men and women must perform military service, often taking advantage of the time to reinforce their knowledge of computer science and other technologies and later attending university, motivated to open their own companies.

The culture also favors daring, risk and innovation. Kon noted that appreciation for individualism and incentives to take risks favored the establishment of technological companies while, on the contrary, strong adherence to hierarchy, tradition, and shame over failure, like in Japan, or the prospect of a steady job in a large company, like in Germany, are deterrents to entrepreneurship. In his view, Brazil is currently in the middle ground between countries with high and low levels of encouragement for entrepreneurs, since repeat business failures are seen as a sign of lack of ability, rather than entrepreneurship. Many entrepreneurs reported that their previous businesses failed because they spent too much money on technology and a lot on marketing, or they spent too little on market testing their products. "The balance between product development and marketing is crucial to the success of a start-up," noted Kon in the technical report he wrote about his work in Israel.

Technion, in Haifa, Israel: focus on physical sciences and support for new innovative companies

TECHNION ISRAEL INSTITUTE OF TECHNOLOGY

of Mathematics and Statistics (IME-USP) and adjunct coordinator of research for innovation of the FAPESP Office of the Scientific Director. "Some of the top 20 largest companies in the world today, such as Google and Facebook, were start-ups less than 15 years ago." The large corporations of today do not just collaborate or compete with small companies, they also buy them when they develop innovations with significant market potential. This happened with Waze, an Israeli company that developed a mobile traffic application and was bought by Google in 2013 for almost $1.3 billion.

MOTIVATED BUSINESSMEN

"I was excellent at being a poor student. I didn't like to follow the traditional way of doing things," recounts Paulo Garcia, referring his time studying mechatronics at the USP Polytechnic School before joining his classmates Marcus Roggero and Leonardo Monteiro to develop an electronic device to read bar codes on price terminals for stores and markets. The first prototypes did not work, but they persevered, participated in the Startup Farm and Start-Up Brasil programs and, in October 2013, founded InfoPrice with the help of another partner, Juliana Glasser.

Finally, they developed a successful version of the equipment that they named Smart Price: a bar-code simulator, coupled with a mobile phone, that interacts with the price-checking device in supermarkets and records the prices of thousands of products in just a few minutes, allowing retail stores to quickly review their sales strategies and manufacturers to analyze their product production and distribution plans. In 2015, with large clients and 46 employees, Infoprice raised R$2 million through the Arpex Capital fund, and transferred company control to B2W Digital, the same company that owns retailers Americanas.com and Submarino.

At a 2015 a conference on supermarkets held in São Paulo, the company's team presented the prototype for its second product, Gondola No Break, already nicknamed "mat," for retail chains. It is an acrylic board containing sensors and chips that is placed on market shelves. It notifies stockers via WI-Fi when a product needs to be restocked, so the consumer always finds what she is looking for. Garcia thought of the idea when he saw Las Vegas refrigerator sensors, which are automatically activated when a beverage is removed. The company plans to begin manufacturing and selling the mat in mid-2016.

Junqueira, from ABStartup, an association of about 4,000 startup companies throughout Brazil—"including 26 in the state of Acre," he adds—watched the action at the first Pitch Corp, held in late 2013 in Belo Horizonte, when the young, rest-

Talent at hand: university students and graduates meet in São Paulo to discuss their developments (*above*) or to run their own companies in shared offices (*below*)

less and creative start-up leaders presented their products to corporation executives. According to him, for every 10 start-ups that present their products to large companies, four make a sale.

A FAVORABLE ENVIRONMENT

Start-ups are doing well because, today, it is relatively easy to found a software company, write a program or mobile-phone application, launch it and attract thousands of users in a few weeks. "Twenty years ago, the cost of writing new programs was on the order of millions of dollars, whereas now only a few thousand are needed," said Kon. In addition, the environment has matured recently. It now favors contacts between start-ups and companies and government agencies interested in their products, with public or private funding sources, and with organizations that support business planning, such as the Brazilian Micro and Small Business Support Service (Sebrae).

According to a survey reported in August 2015 in the newspaper *Valor Econômico*, the international fund Fundacity had recorded investments of R$170 million in 191 Brazilian start-ups made by 45 investors in the first half of 2015. Experts predict that the current economic crisis could adversely affect the flow of investments to start-ups. However, observed Kon, "there has been increased investment in information technology and software in recent years as a way to improve company productivity, which has been very good for software start-ups."

For Junqueira, one of the challenges in the coming years will be motivating young entrepreneurs to take a chance on their ideas and establish their companies without fear of messing up. Among start-ups, stories of failures are common, but seen as a sign of maturity. "Few students consider entrepreneurship as an alternative to getting a job after graduation," noted Kon. To change this, he and other IME-USP professors, students and former students founded IMEmpreende, an entrepreneurship group that already has 1,221 members, mostly former students, and meets at least once a month.

"We are not yet lucrative and there is a chance that it won't work out, but I really believe in the project," said Daniel Cukier in one of the presentations at the last IMEmpreende meeting of 2015, held at Google's São Paulo office. Cukier splits his time between doctoral research at IME and his start-up, Playax. Founded in 2014, the company monitors 5,000 radio stations, 60 TV channels and 1,000 sites to automatically identify how often and where about 700,000 songs are played, in order to facilitate copyright management and show planning according to public preferences.

Cukier's colleague Julian Monteiro, after completing his doctorate in France, also co-founded a company in 2014, called Scipopulis. It now offers two products: an application that allows

users to see when the bus they are waiting for will arrive, which has already been downloaded 5,000 times, and a public transport monitoring panel, which is helping public agencies monitor bus service and plan adjustments to the São Paulo city network. "We use open data supplied by the São Paulo government," said Monteiro, describing the transformations in the world of start-ups taking place.

In 1999, when the price-comparison site Buscapé—today seen as an example of a successful Brazilian start-up—was established, databases were rare and funding for start-ups was minimal. During the event announcing the 15 companies selected to work with the São Paulo State government, Romero Rodrigues, one of the company's founders, recounted that he and his partners originally called stores, and were told that they did not provide prices over the telephone. Slowly but surely, Buscapé grew and now contains records for 11 million products. In September 2015, Rodrigues resigned from his position as president of the company—purchased in 2009 by the South-African media group Naspers for $342 million—to join a start-up investment fund.

THINKING GLOBALLY

According to a study by the Dom Cabral Foundation, in Belo Horizonte, based on interviews with the directors of 130 Brazilian start-ups currently in operation and 91 former directors of defunct start-ups, at least 25% of innovative small companies fail within a year, half fail within five years, and 75% close within 13 years, mainly due to lack of funding. Based on a research trip to Israel, Fabio Kon concluded that start-ups' chances of survival are greater when, in addition to a good project and a good team, they are linked to universities, research centers and larger companies with whom they can interact, they are immersed in a social environment that values boldness and creativity, and they have access to funding and legal and tax structures favorable to the development of new technological undertakings (see box on page 20). These connections form what Kon called a start-up ecosystem, which allows us to analyze the strengths and limitations of the Brazilian reality.

"We need more global start-ups. We need to think globally, not just about the domestic market," he commented, referring to the fact that Brazilian companies are less ambitious than those he studied in other countries. The 10-year trajectory of Easy Taxi shows that one can go beyond national borders. This company's app, developed by Tallis Gomes, from Minas Gerais State, after several failures, is now used by more that 17 million people in 420 cities in 30 countries, and it has 400,000 registered professional drivers. ■

Condominium of companies in São Paulo houses dozens of young entrepreneurs: they make connecting with each other and discussing their plans a routine task

Projects

1. *Entrepreneurship in computer science and the software start-up ecosystem* (No. 2013/06146-7) **Grant Mechanism**: Scholarship abroad - Regular; **Principal Investigator**: Fabio Kon (IME-USP); **Investment**: R$31,811.14.
2. *Application of the Hourus platform for industrial automation and equipment* (No. 2010/51286-3); **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Igor Bittencourt Santiago (I.Systems); **Investment**: R$95,888.22 and $1,210.71.
3. *A mobile application for obtaining updated public-transport information based on collective knowledge* (No. 2013/50812-1); **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Roberto Speicys Cardoso (Scipopulis); **Investment**: R$47,152.87 and $990.00.
4. *Eye trackers* (No. 2014/50398-3); **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Camilo Rodegheri Mendes dos Santos (Dev Tecnologia); **Investment**: R$511,705.48 and $12,465.00.
5. *Ultra-wide spectral-range tunable laser, hybrid in silicon photonics for DWDM system applications* (No. 2014/21731-6); **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Wilson de Carvalho Júnior (BrPhotonics); **Investment**: R$144,037.27 and $282,901.75.
6. *Band S transmitter for Doppler meteorological radar system* (2002/07909-0): **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Jean Claude Lamarche (Omnisys); **Investment**: R$109,311.96.
7. *Large-scale breeding of stingless bee colonies and their commercial use for agricultural pollination* (No. 2012/51112-0); **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Cristiano Menezes (Promip); **Investment**: R$627,224.03 and $3,913.46.
8. *Platform for automatic identification of songs and management of copyright* (No. 2014/50380-7); **Grant Mechanism**: Innovative Research in Small Businesses Program (PIPE); **Principal Investigator**: Juliano de Moraes Polimeno (Playax); **Investment** R$34,660.95 and $16,290.00.

Scientific Articles

PAMPLONA, J. B. and YANIKIAN, V. P. M. O sistema federal de financiamento à inovação no Brasil. **Pesquisa e Debate**. V. 26, No. 1, p. 35-72, 2015.

KON, F. et al. A panorama of the Israeli software start-up ecosystem. Technical report. **Social Science Research Network**. March 2014.