

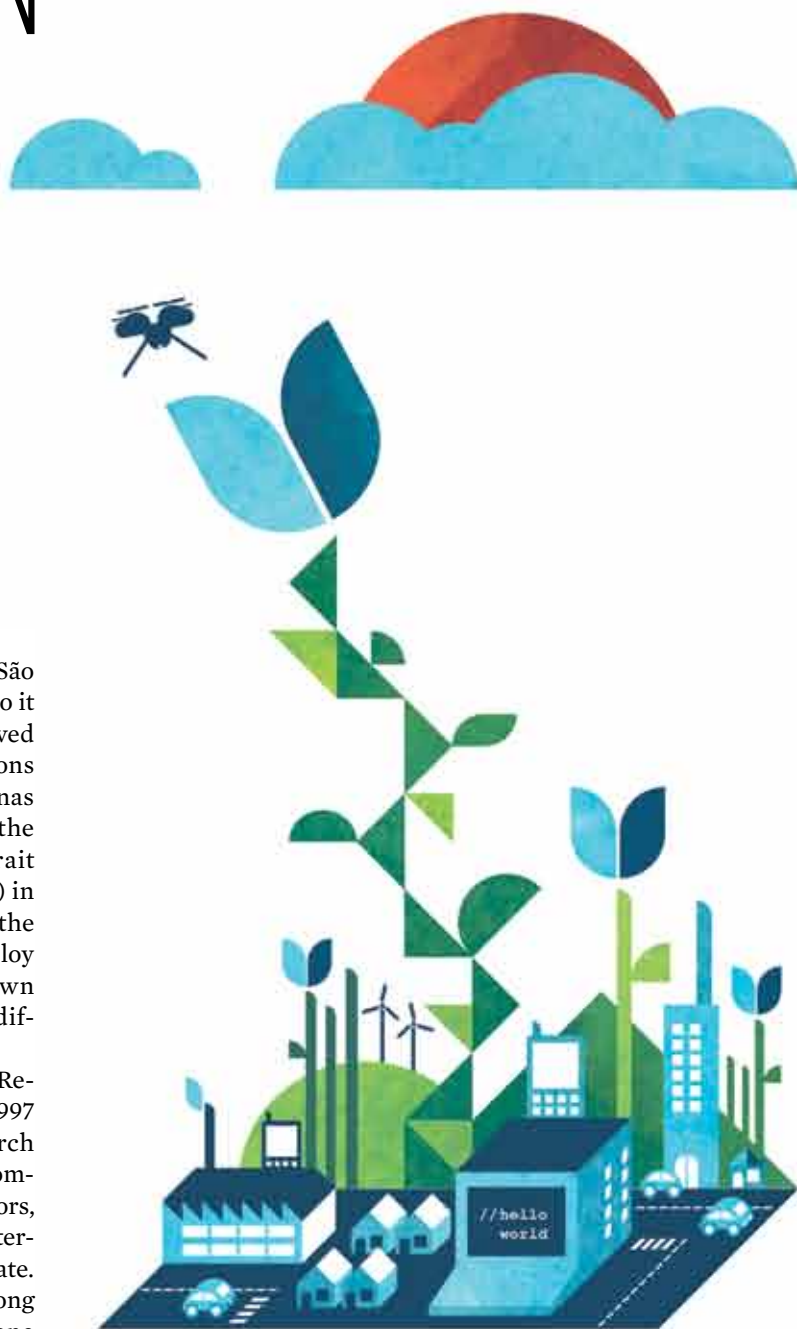
FERTILE GROUND FOR INNOVATION

Study examines distribution of projects among São Paulo's technology-based small businesses and identifies São Carlos as the zone of greatest density

Bruno de Pierro

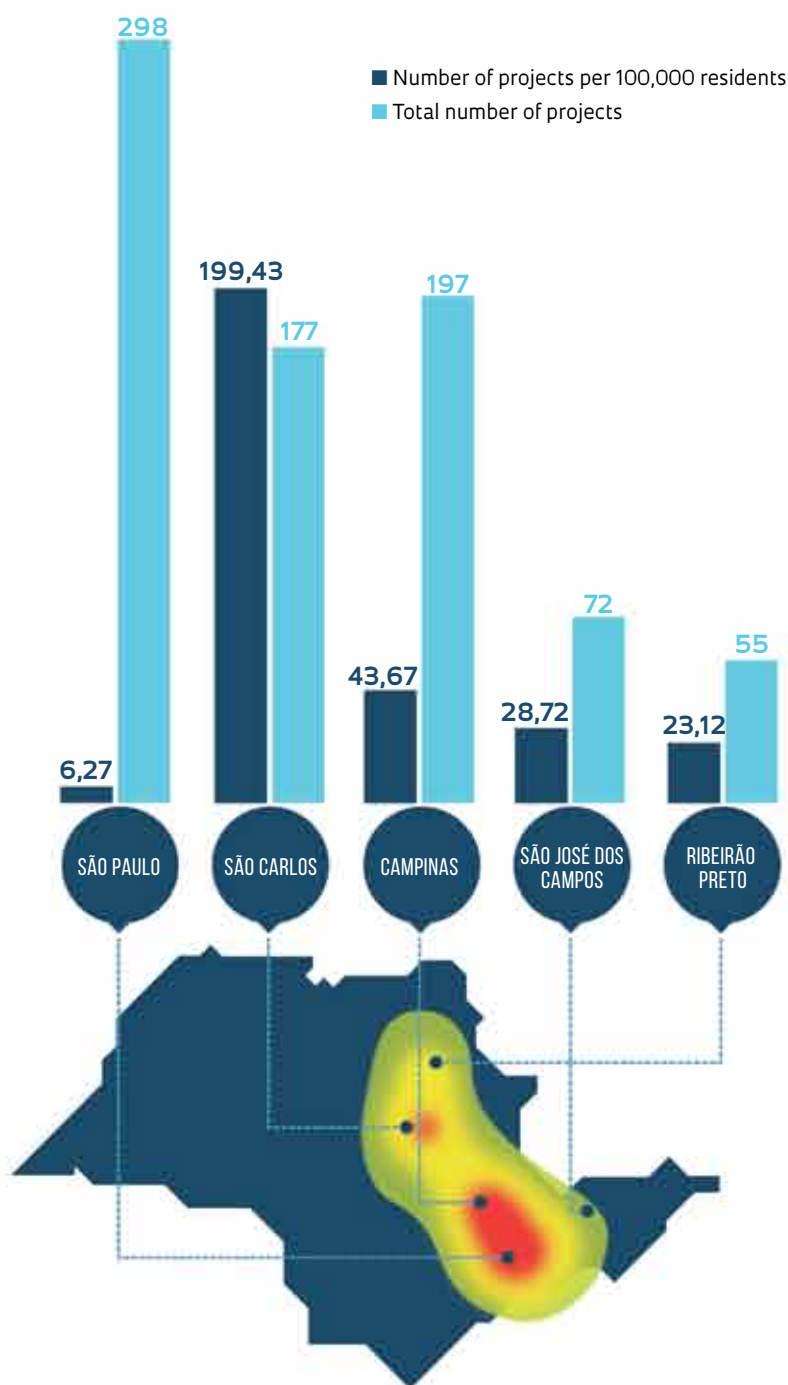
The formation of innovation hubs in the state of São Paulo is influenced by certain factors peculiar to it and does not always follow the trajectory observed in other countries. This is one of the conclusions of a study by researchers from the University of Campinas (Unicamp) and the George Washington University, in the United States. They analyzed the prevalence of the trait known as knowledge-intensive entrepreneurship (KIE) in different regions of São Paulo State. The term refers to the concentration of young, innovative companies that employ new technologies generated by universities, or by their own people, to take advantage of business opportunities in different industries.

The researchers used data from FAPESP's Innovative Research in Small Businesses Program (PIPE), which since 1997 has been supporting scientific and technological research among microenterprises and small and medium-sized companies in São Paulo municipalities. According to the authors, PIPE data are a reliable, albeit restricted, indicator for determining where business innovation is occurring in the state. The study examined 1,130 PIPE projects distributed among 114 cities where companies had been granted at least one



KNOWLEDGE-BASED COMPANIES

Total number, and figure per 100,000 residents, of FAPESP Innovative Research in Small Businesses Program (PIPE) projects, in five São Paulo municipalities between 1998 and 2014



The areas shown in warmer colors on the graph indicate the regions of highest concentration of PIPE projects in absolute numbers

project between 1998 and 2014. Five cities stood out for their high concentration of projects: São Paulo (298 projects), Campinas (197), São Carlos (177), São José dos Campos (72) and Ribeirão Preto (55). Researchers observed that, although the state capital hosts the largest number of projects, in relative terms it is São Carlos that stands out, with 199 PIPE projects per 100,000 residents (see graph).

One of the original contributions of the study was to show that, unlike what literature says about the formation of innovation clusters in developed countries, the presence of large urban communities in the state of São Paulo did not automatically produce a concentration of knowledge-intensive enterprises. The authors theorize that in developed countries, certain economic disadvantages typical of large metropolises persuade companies to depart for other regions. The researchers cross-checked data on the concentration of PIPE projects with socioeconomic data furnished by the Data Analysis System Foundation (Seade). They found, for example, that mobility indicators such as the number of residents per automobile, and demographic factors like population density have a negative impact on the decisions by PIPE project grantees to decide where to locate. But other indicators they analyzed, such as the crime rate, seem not to play a role. “Excessive traffic in the big cities affects logistics, boosts the cost of innovation, and can be pointed to as one of the causes of de-industrialization of the state capital in recent decades,” explains Bruno Brandão Fischer, a professor at the School of Applied Sciences at Unicamp’s Limeira campus and principal author of the study, which was presented at the 2015 Atlanta Conference on Science and Innovation Policy, an event held every two years in the United States.

However, the relative proximity of small technology-based companies to major urban centers was shown to be a decisive factor in the emergence of innovation zones. “It is in the financial centers that one finds potential customers, the users of technology services,” says Sérgio Robles Reis de Queiroz, a professor in the Department of Science and Technology Policy of the Institute of Geosciences at Unicamp, also an author of the article. “For people who do business research in the state of São Paulo, it is good to be close to the capital city and the knowledge produced there, but not necessarily inside the urban core,” explains Queiroz, who is a member of the Adjunct Panel of the FAPESP Research for Innovation section.

The study does not focus on the reasons that place São Carlos at the head of the list, but cites some hypotheses related to the local conditions that favored the concentration of PIPE projects



The National Synchrotron Light Laboratory in Campinas (above), and research in photodynamic therapy at the São Carlos Institute of Physics/USP (at right): the two cities have different innovation systems

in the city. “We are starting to develop a study about São Carlos and can already conclude that the local research infrastructure, which includes the Federal University of São Carlos (UFSCar), a campus of the University of São Paulo (USP), and companies like Embrapa, plays a vital role,” Fischer reports.

The city has a high concentration of PhDs. A study done in the mid-2000s by Jorge Oishi, a statistician and retired UFSCar professor, showed that São Carlos had, at the time, 1,700 PhDs, among a population of about 230,000. That was also where, in 1985, one of Brazil’s first technology-based company incubators was established at the High Technology Park Foundation (ParqTec) near both UFSCar and USP campuses. According to the study, other factors that have an impact on the concentration of PIPE projects in that city are related to urban mobility and a lower cost of living.

São Carlos lies 230 km from the capital city of São Paulo, about a two-hour drive. Marco Antonio Pereira, a partner in Itera, a company that has been doing business in São Carlos since 2008 and specializes in technological solutions for electronic document management, usually goes to São Paulo every week. “That’s where our principal clients are,” he says. The decision to set up in São Carlos had to do with the city’s scientific environment. “It takes us only a few minutes to get to the computer science departments of USP and UFSCar, with which we work frequently,” explains Pereira, who holds a master’s degree in computer science from UFSCar.

In 2015, Itera received support from PIPE to develop a software application that extracts

key concepts and important words from large volumes of documents and helps organize them. The company entered into a partnership with the Institute of Mathematical Sciences and Computation (ICMC-USP). “That institute is well connected to international networks. The arrangement with the ICMC is a way to keep our company in tune with knowledge at the global level.”

The phenomenon is observed in other cities, based on similar arguments. “We are in São José dos Campos, only 100 km from São Paulo. The short distance enables us to promote new business in the state capital without having to incur high costs, such as office space rental there,” explains Renata de Cássia Ferreira Silva, a partner in RVT, a company working on electricity

consumption management. In 2015, RVT received support from the PIPE to develop a simulator capable of estimating reductions in electricity use achieved by industrial refrigeration equipment. The company partners in its studies with the School of Chemical Engineering at Unicamp and the São José dos Campos Technology Park, entities that are in regular contact with major companies like Embraer, Vale, Ericsson, and Sabesp.

DIFFERENT PROFILES

The findings of the study are sparking debate on the reasons why cities like São Carlos and Campinas, both widely known for innovation, exhibit different profiles in the concentration of projects developed by small companies. Although in absolute terms their performance is similar, in relative terms the difference is significant: São Carlos has 199 PIPE projects per 100,000 residents while Campinas, with a population four times larger than that of São Carlos, has 43 projects per 100,000 residents. Economist Marcelo Silva Pinho, a professor at UFSCar, explains that the two cities have very different local innovation systems. According to Pinho, most of the startups established in São Carlos were born of projects developed within the city’s universities. “In São Carlos, a lot of companies have sprung from individual initiatives taken by researchers and professors. In Campinas, however, which has a more complex industrial environment, several technology-based firms have split off from other companies,” he explains. Such features can influence the concentration of PIPE projects. One possibility, suggests Pinho, is that entrepreneurs

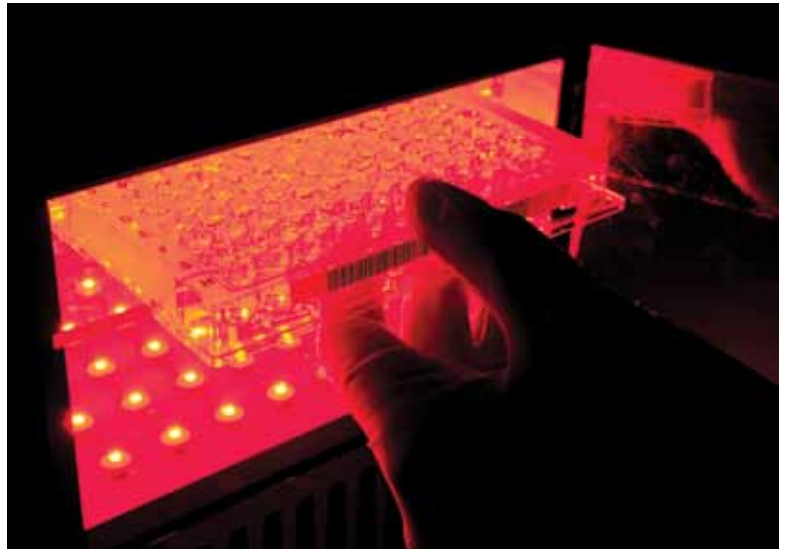
who have an academic background are more familiar with the procedures necessary to draft projects and respond to requests for proposals, while businessmen with experience in industry resort to other expedients to obtain financing.

The differences between the innovation systems in São Carlos and Campinas can also be observed in the ways companies relate to the local knowledge environment, suggests Gustavo Benevides, a professor at the School of Business Administration, Marketing and Communication in Campinas (ESAMC) and author of articles on formation of technology hubs in the interior regions of São Paulo. “In Campinas, I noticed that companies interact quite a lot with centers of excellence like the Brazilian Center for Research in Energy and Materials (CNPEM), the Renato Archer Research Center, the Mantiqueira Technology Innovation Center, and the Eldorado Institute, sometimes even more than they do with Unicamp,” Benevides points out. He says this dynamic reflects an innovation system whose authors interact sporadically and in a more disperse manner. “In Campinas, the research institutes don’t talk to each other very much. They act more independently and have more contacts with the market. And Campinas companies, when they need solutions promptly and urgently, call on those institutes.”

But in São Carlos, as the researcher sees it, the closest relationships are with universities. “There are three technology parks in São Carlos that are closely connected with UFSCar and USP. This means that the interaction between universities and companies is more vibrant in São Carlos,” he believes. Sérgio Queiroz argues that studies have yet to show, using concrete data, which factors distinguish the innovation systems in the two cities. “Our research did not propose to answer that question,” he emphasizes.

FORMATION OF CLUSTERS

In developed countries, large urban communities often house good universities and attract knowledge-intensive enterprises to their vicinity. “It is important that companies and startups settle in cities where it is easy to mobilize the research groups at universities as a means of finding solutions to their technological problems,” explains Renato de Castro Garcia, a professor at the Institute of Economics of Unicamp. In



“For companies that do research, it’s good to be close to the state capital, but not necessarily inside the urban core,” says Sérgio Queiroz

his opinion, the concentration of knowledge at universities is one of the main factors that has led certain localities to become consolidated as innovation hubs.

In Silicon Valley, California, for example, the advantages of being close to the flow of information from technology companies, a skilled work force, the research infrastructure, service providers and major investors outweigh the high costs prevailing in the region, observes AnnaLee Saxenian, a professor at the University of California, Berkeley, a researcher in the field of innovation geography. “Although there is traffic congestion and a higher cost of living, innovative startups are continuing to emerge in Silicon Valley,” says the researcher, who attended a workshop on innovation at FAPESP headquarters in June 2016.

Cluster success also depends on other factors. “To be successful in a globalized economy, cities must be connected to global networks of knowledge, through exchanges of researchers,” observes Nicholas Vonortas, a professor at George Washington University and one of the other authors of the study. Until 2019, Vonortas will be coordinating a project on innovation systems at Unicamp in the context of FAPESP’s São Paulo Excellence Chairs (SPEC) program. Sérgio Queiroz, from Unicamp, points out that the study helps identify where on the map of the state of São Paulo the soil is most fertile for innovation. “These are the cities where investments directed toward business research have the best chance of producing a return,” he concludes. ■



Project

Innovation systems, strategies and policies (No. 2013/50524-6); **Grant mechanism:** São Paulo Excellence Chairs (SPEC); **Principal Investigator:** Nicholas Spyridon Vonortas (Institute of Geosciences-Unicamp); **Investment:** R\$992,533.20 (for the entire project).