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Braga brings world class innovation

A FAST-GROWING TECH AND TALENT HUB IN PORTUGAL



Photo credit: Municipality of Braga

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CONTENTS

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HOW BRAGA COMBINES TRADITION AND TECH

04 The Portuguese city of Braga is rich in history, but there is nothing ancient about its investment offering given its embrace of tech-related sectors and its close relationship with the scientifically renowned University of Minho.

AN INTERNATIONAL STAGE

06 The mayor of Braga, Ricardo Rio, tells fDi about the Portuguese city's tech talent and pioneering business agenda, which have given it new-found global prominence.

INNOVATION SALVATION

07 With its university, businesses and government working in close harmony, Braga has transformed itself into a tech hotbed. However, its ambitions are now global.

CLEAN AND HEALTHY

09 Braga's first-class centres for medical research are thriving in conjunction with the city's entrepreneurial ecosystem, while 'clean technology' research is also becoming a local strength.

How Braga combines tradition and tech

THE PORTUGUESE CITY OF BRAGA IS RICH IN HISTORY, BUT THERE IS NOTHING ANCIENT ABOUT ITS INVESTMENT OFFERING GIVEN ITS EMBRACE OF TECH-RELATED SECTORS AND ITS CLOSE RELATIONSHIP WITH THE SCIENTIFICALLY RENOWNED UNIVERSITY OF MINHO.
SEBASTIAN SHEHADI
REPORTS

Contrasting worlds collide in Braga. Past and present, Roman history and nanotechnology, countryside and concrete. Situated among the scenic valleys and rivers of northern Portugal, close to Spain and a 30-minute drive from Porto, it is one of the country's largest cities with about 200,000 inhabitants.

Despite its rich history, the university-city has the youngest population in Portugal, according to the Institute of National Statistics. It is also ranked as Portugal's 'third city', after Lisbon and Porto, in terms of its number of exports since 2017 and GDP growth since 2014 – at 1% above the national and Iberian average, according to investment promotion agency (IPA) Invest Braga.

Moreover, the city was ranked as the third best location for business in Bloom Consulting's 2019 Portugal City Brand Ranking. An innovation leader in its own right, Braga files the most patents in Portugal in real numbers, exceeding Lisbon and Porto.

Once a capital of the Roman Empire, Braga is one of the oldest continuously inhabited Christian cities in the world, and boasts the oldest cathedral in Portugal, thereby making it a Catholic landmark and the country's religious centre. Now the city has evolved into a centre of innovation in Portugal and Iberia.

A degree of success

Following Portugal's transition to democracy in the 1970s, Braga witnessed explosive growth in its population and economy, especially in the construction and manufacturing industries. However, mayor Ricardo Rio says: "What has had the biggest impact on Braga over the past 50 years was the creation of the University of Minho, which has been a continuous source of population renewal, attracting and producing talent, [research and opportunity]."

The University of Minho, known locally as UMinho, was founded in 1973 as part of a wave of new institutions aimed at modernising Portugal's education environment and stimulating its economic development. From its inception, the university focused on science

and technology, and taught subjects that were previously unavailable to the Portuguese, such as informatics. It now has the leading informatics department in Portugal, according to Rui Vieira de Castro, the university's rector.

"Being a research university was a clear target for UMinho. It also sought to develop very close links with companies and government agencies. In five decades we have become one of the best in the country," he adds.

UMinho, a community of 22,000 people, has become a research university of international repute, reflected by its high position in the Leiden Ranking, the Times Higher Education University World Rankings and the Shanghai Ranking.

Of all Portugal's universities, UMinho has received the most EU grants, and is developing some interesting projects with Massachusetts Institute of Technology and Carnegie Mellon in the US, according to Mr Vieira de Castro. It also boasts the country's only supercomputer. "What differentiates UMinho from other Portuguese universities is our continuous and strong commitment to everything that is around us, especially companies," adds Mr Vieira de Castro.

Bosch in Braga

Bosch's story stands as a testament to this commitment. The engineering and electronics company has been in Braga since the 1990s, though its growth in added-value activities over the past decade marked a significant turning point for the city.

For two decades Bosch's Braga branch was assembling fairly basic electronic components, forming part of the wider region's thriving manufacturing industry. "However, in 2010, the company began its partnership with [UMinho]. Since then, the university became an extension of our plant and the growth in R&D has been tremendous. The next phase of research will represent more than €100m into Bosch and our partner universities in Portugal," says Carlos Ribas, Bosch's Portuguese representative.

In 2015, the Braga plant employed 1700 people; today, a workforce of 4000 produces electronic products such as car navigation systems. German chancellor Angela Merkel opened the site's technology centre in 2017, which is now



Winning hand: Braga was ranked as the third best location for business in Bloom Consulting's 2019 Portugal City Brand Ranking

home to several hundred researchers working on sensors and software for automated vehicles.

“Bosch’s evolution leveraged Braga and the university, bringing it attention it didn’t have before. It demonstrated the expertise and the quality here,” says Tiago Miranda, executive director of innovation for bio-sustainability at UMinho. “This started an investment snowball, with large tech companies such as Farfetch, Fujitsu and Accenture setting up here. UMinho’s IT and engineering students are being hired before they end their courses.”

New vision

The departure of Braga’s long-serving former mayor in 2013, following a 37-year spell in the job, led to new leadership that set out to transform the city’s business climate. Mr Rio entered office at a time when the financial crisis in Portugal was undermining Braga’s traditional industries, and graduate unemployment in the city was as high as 30%, according to Alexandre Mendes, director of StartUp Braga.

“When Mr Rio arrived, we needed really different solutions and a whole new strategy. So it was really original and effective when he created Invest Braga, [which has been] an engine of growth. He installed an international mindset, telling us we could export knowledge and tech from Braga to the world,” adds Mr Mendes.

Invest Braga was the first local investment promotion agency in Portugal, inspiring Lisbon and Porto to launch their own counterparts. Soon after, Mr Rio set up StartUp Braga, an incubator that has supported 145 start-ups since 2014.

Since its inception, Mr Rio’s Strategic Plan for the Economic Development of Braga 2014-26 has attracted significant investment, both local

and foreign, such as €256m for the +Industry Programme (which is part of the 2014-2026 plan). Four years after the strategic plan began, 7000 jobs had been created and unemployment was cut by 49% in Braga, compared to 35% in Porto, according to the Institute for Employment and Vocational Training.

Growth has been driven by the city’s key sectors: engineering; innovation and shared services; industry and construction; ICT and electronics; health and medtech; and tourism and culture.

Forum Braga

Tourism and special events have played a big part in raising Braga’s international profile, something the city is keen to build upon. The number of visitors to the city grew by 88% between 2014 and 2017, while its accommodation capacity rose by 27%, according to the tourism office. With hotel supply playing catch up, this appears to present a potential investment opportunity. Seven new hotels were opened in 2018, according to Invest Braga.

Braga was also ranked the second best European destination to visit in 2019, after Budapest, by Best European Destinations 2019. The opening of Forum Braga in 2018, the second largest mixed-use event space in Portugal, has boosted visitor numbers and cultural development. For example, it has hosted artists such as Bryan Adams and 30 Seconds to Mars, while the annual agricultural fair attracts 42,000 people over three days. This summer’s international World Dance Cup will host 9000 people.

“I’m from Braga, and there’s a vibrating energy that didn’t exist 15 years ago. Braga’s changed,” says UMinho’s Mr Miranda. ■

O&A: RICARDO RIO

An international stage

THE MAYOR OF BRAGA TELLS SEBASTIAN SHEHADI ABOUT THE PORTUGUESE CITY'S TECH TALENT AND PIONEERING BUSINESS AGENDA, WHICH HAVE GIVEN IT NEW-FOUND GLOBAL PROMINENCE

Q You are widely credited with having transformed Braga into a much more investment-friendly and open destination. Do you agree?

A Not being very modest, I would definitely agree. I think I filled the gap. Braga is an important city full of resources. When I became mayor in 2013, we had so much potential that had accumulated, but had not been taken care of. So I think that my biggest impact was gathering public, private and academic players to the same table, and aligning the strategy of the city's growth, thereby [increasing] projects and results.

My first initiative was to create Invest Braga, the first local economic development agency in Portugal, which then had a couple of replicas such as Invest Porto and Invest Lisbon. [I also established Start-up Braga], to foster the city's entrepreneurial spirit. It is not a broad scope incubator or accelerator, and it has four main areas: IT, biotechnology, nanotechnology and health sciences – which are our strengths.

Q How else are you giving Braga global significance?

A In terms of international promotion, one of the biggest changes in Braga since I was elected is its openness to the world. We started participating in all international networks, such as the Global Parliament of Mayors. I am also one of the OECD's champion mayors for inclusive growth, a network of mayors from all over the world.

Our growth in tourism is also spreading the word, as well as having companies in Braga such as Bosch, one of the best companies in the world. Bosch is investing in Braga not as it would in Morocco or eastern Europe – to take advantage of low wages – but because of our knowledge and ecosystem do top-notch research and create new innovative products.

Q Do you believe the Portuguese government gives enough support to Braga, and other cities outside Lisbon?

A I don't want the national government to create any obstacles. What I expect is [for it to] make our



CURRICULUM VITAE

RICARDO RIO

2013

Braga
Mayor

Previously
Capital Markets Institute of Euronext, director

work easier, not more complicated. In terms of the national investment policy, it has been a problem with all governments and all parties: they just look to Porto and Lisbon, especially for infrastructure.

For instance, regarding our transportation system, until this year Braga provided all the funding for transportation from the local budget. In Lisbon and Porto they were funded by the national government, with a lot of investment. It's a completely different reality here.

Q Braga produces lots of talent, but is there enough supply for medium or large foreign companies?

A I think our biggest safety net is the quality of life in the city. We have managed to guarantee a high quality of life to our population. Therefore, people come to Braga – youngsters and very skilled individuals – because they have the job opportunities, cost-competitiveness and everything they need to have a family or happy personal life.

Braga has high levels of education, and is home to one of the best hospitals and health systems in the country. We have a wide dynamic in terms of sports, activities, and in terms of culture, infrastructure and leisure. ■

BOSCH IS INVESTING IN BRAGA NOT TO TAKE ADVANTAGE OF LOW WAGES BUT BECAUSE OF OUR KNOWLEDGE AND ECOSYSTEM



Seat of learning: UMinho accounts for about 10% of the scientific research in Portugal

Innovation salvation

WITH ITS UNIVERSITY, BUSINESSES AND GOVERNMENT WORKING IN CLOSE HARMONY, BRAGA HAS TRANSFORMED ITSELF INTO A TECH HOTBED. HOWEVER, AS SEBASTIAN SHEHADI FINDS, ITS AMBITIONS ARE NOW GLOBAL

The past decade has seen Braga become an innovation hub for Portugal and the wider Iberian peninsula through its thriving start-up ecosystem and world-class specialisms in medical technology and automobiles, to name a few.

In other words, Braga has talent. The city files the most patents in Portugal in real numbers, exceeding Lisbon and Porto, and has the country's second highest rate of higher education students in science and technology, according to Portugal's Institute of National Statistics.

Talent machine

The backbone of Braga's talent pool is the University of Minho (UMinho), one of Portugal's leading research universities, ranked among the 150 best in the world for institutions under 50 years old, according to the Times Higher Education's 2018 ranking.

UMinho accounts for about 10% of Portugal's scientific research, a higher figure than the university's proportion of national researchers, according to Invest Braga. The clini-

cal research centre 2CA, based in UMinho's medical school, hosts 40% of Portugal's clinical trials.

The city is also home to the International Iberian Nanotechnology Laboratory (INL), an inter-governmental research centre. For three consecutive years, INL has submitted more patents to the European Patent Office than any institution in Portugal.

Triple helix

Braga is also an example of the 'triple helix', where innovation and economic development are led by university-industry-government collaboration. Triple-helix ecosystems accelerate R&D through knowledge transfer, application and financial support.

The mayor of Braga, Ricardo Rio, has pushed this agenda since taking office in 2013. "[My] biggest impact [has been to gather] public, private and academic players around the same table, and align the strategy of the city's growth," he says. This led to the creation of Invest Braga, Startup Braga and other initiatives to bol- ▶

ster growth and internationalism.

Mr Rio has built on Braga's existing culture of industry partnerships. For example, UMinho was founded in 1973 with the express desire to develop close links with companies and government agencies, according to Dr Rui Vieira de Castro, the university's rector, something it has successfully achieved.

Collaborative labs

UMinho recently partnered IBM [and INL], within the quantum field of 'computation' as part of the university's collection of 'collaborative laboratories' aimed at developing research for the needs of companies, such as IKEA and Renewal, according to Mr Vieira de Castro.

"[Accenture Portugal] has partnerships with other Portuguese universities, but UMinho is probably the best university in working directly with industry and companies. It is very open to this, whereas others can be inward looking," says Susana Mata, managing director of Accenture Portugal.

This is no surprise, since northern Portugal – especially Braga's Minho region – is known for its commerciality and industriousness, according to Tiago Miranda, executive director of UMinho's Institute of Bio Sustainability.

UMinho's partnership with Bosch, which dates back to 2010, has drawn particular international attention. "[The university] became an extension of our plant and the growth in R&D has been tremendous," says Carlos Ribas, Bosch's Portuguese representative.

The company's facility employs almost 4000 people producing electronic components such as car navigation systems, and has several hundred researchers working on sensors and software for automated vehicles at Bosch's Technology Centre, which was opened in 2017. Technology produced at Bosch Braga is used in 80% of all new vehicles, worldwide, according to Invest Braga.

Crisis solved?

Braga's tech ecosystem has also been nurtured by Startup Braga, an incubator set up by Mr Rio to assist startups in reaching international markets, and within three areas: nanotechnology, health technology and digital economy.

"These three [sectors] are where Braga can be most competitive for international standards, driven by

[ACCENTURE] HAS PARTNERSHIPS WITH OTHER UNIVERSITIES, BUT UMINHO IS PROBABLY THE BEST IN WORKING WITH INDUSTRY AND COMPANIES



the huge tradition in Portugal, specifically in Braga, to develop IT companies. Many of the largest were born in Braga or [have been started by] UMinho's alumni, [such as tech unicorn Farfetch]," says Alexandre Mendes, director of Startup Braga. He adds that Braga was hit hard by Portugal's financial crisis and, in 2014, when Startup Braga was established, graduate unemployment in the city was as high as 30%, so creating jobs through innovation was a solution.

Startup Braga has supported 145 startups since its inception, creating 400 jobs and raising €26.9m. The organisation does not finance these start-ups, but provides office space and expertise through its network of industry partners, such as INL. This network is what distinguishes Startup Braga from the 145 other incubators in Portugal, in another example of Braga's 'triple helix' approach in operation.

"[Thanks] to the mayor's alignment strategy, what makes Startup Braga unique and effective is our huge alignment between the city's 24 largest stakeholders, companies, the national employment service, and UMinho," says Mr Mendes.

One of the most successful companies to come out of Startup Braga is Swordhealth, a provider of remote physical therapy based on sensor technology. It now operates in the US, and recently secured about \$8m from in funding Khosla Ventures. Startup Braga's record has earned international recognition, with applications from 12 countries in the latest round of its acceleration programme.

Welcome to Braga

Indeed, Braga's flourishing tech ecosystem has attracted numerous foreign companies. For example, Japan's Fujitsu employs 500 people in the city, and Ireland-based Accenture opened a technology delivery centre in 2017, now home to 250 people providing support to clients in Europe, Africa, North

America and Latin America.

"[We invested] in Braga to benefit from [UMinho's] high-quality technical skills and Braga's young population, [with many people aged between] 20 to 30 years old. Also the cost of living, compared with Porto or Lisbon, is very attractive, as is the proximity to Oporto Airport," says Ms Mata at Accenture Portugal.

"Although young, our Braga branch has a good reputation. An area that we are developing is robotics and artificial intelligence, and we're going to work with OutSystems in Braga," she adds.

OutSystems is one of Portugal's most successful software companies – a platform for web and application development – now headquartered in the US, similar to Portugal-founded Farfetch, which is now a London-based online fashion retailer valued at more than \$1bn. Both companies have R&D centres in Braga.

London-based cybersecurity company In:technical is planning to move to Braga due to the talent and industry cluster in the city, while Israel's Checkmarx, also in cybersecurity, already employs 200, says Mr Mendes.

Bringing locals home

With so much business coming to Braga, alongside the global war for tech talent, will the small city of Braga run out of tech wizards?

"Talent supply is currently our biggest challenge. That's why we launched the 'Talent Project', in which we gathered Braga's 25 largest companies to [discuss their employment needs]. Separately Braga [is benefiting from immigration]. We have received more than 10,000 Brazilians in the past two years, on top of attracting people from Portugal," says Mr Rio.

Moreover, Braga is seeing increasing numbers of Portuguese citizens remaining in the city, or returning from abroad as the national economy continues to recover, according to Mr Mendes. Little wonder Invest Braga's marketing slogan is: "Mom, I'm staying in Braga. Don't worry." ■



Cutting edge: UMinho's work in the life sciences field has attracted worldwide attention

Clean and healthy

BRAGA'S FIRST-CLASS CENTRES FOR MEDICAL RESEARCH ARE THRIVING IN CONJUNCTION WITH THE CITY'S ENTREPRENEURIAL ECOSYSTEM, WHILE 'CLEAN TECHNOLOGY' RESEARCH IS ALSO BECOMING A LOCAL STRENGTH. SEBASTIAN SHEHADI REPORTS

Braga is home to world-class research in bioscience, health-care and nanotechnology, thanks in large part to the school of medicine at the University of Minho (UMinho), where 40% of Portugal's clinical research trials are hosted at the Academic Clinical Centre (2CA), according to school president Nuno Sousa. Braga's private sector and the Institute of Bio Sustainability are also making a name within



IF YOU HAVE A GREAT IDEA, YOU [CAN] COME TO US AND WE CREATE THE NANOTECH IN OUR COMMERCIAL AND INDUSTRIAL-GRADE LAB



the clean technology field.

The university city of Braga is one of Portugal's innovation and talent hubs. UMinho ranks among the 150 best universities in the world that are under 50 years old, according to the Times Higher Education's 2018 ranking, and its school of medicine is widely recognised as a leader in its field in Portugal.

Central to the school's mission has been clinical research in health-care, especially digital solutions for preventative care and chronic diseases. Since its residency programme was created in 2000, candidates have achieved the highest scores across Portugal, according to Mr Sousa.

"We have a very strong reputation in Portugal. Our students also performed really well in front of the US's National Board of Medical Examiners, and we received three certificates of excellence from the Medical Association for Education in Europe," he adds.

Market minded

In line with Braga's university-industry-government innovation vortex, the school of medicine has potent links to public and private sector research.

Responding to the lack of clinical research in Portugal, it collaborated with the Hospital of Braga and other entities to create the 2CA, which focuses on bioscience innovation, such as new biomaterials and diagnostic strategies. Industry leaders such as Roche, Novartis, GSK undertake commercial research trials at 2CA.

"2CA attracts lots of domestic and international researchers, big pharma companies and small startups in the region, who runs tests in our lab. [It] is recognised for being really refined for the market," says Mr Sousa.

Meanwhile, the school's Life and Health Sciences Research Institute (ICVS) attracts 86% of its funding ▶

from EU and North American sources, which Mr Sousa says reflects its international scope and competitiveness.

Medtech centre

Together, ICVS and 2CA aim to find digital solutions for healthcare, thereby tapping into Braga's entrepreneurial start-up scene and expertise in IT and deep tech. Furthering this is the school of medicine's P5 Medical Digital Centre; its recent opening was attended by the EU commissioner for research, science and innovation.

"Our digital health cluster is a complex ecosystem creating a network that is interesting to investors, and we have business angels and venture capital all around us. We have companies setting up branches here, such as one of the biggest endoscopic surgeries, Germany's Karl Storz, which we share a lab with," says Mr Sousa.

"Another thing that we are witnessing is that the number of spin-offs we have created is growing, and a lot of these are already attracting international money," he adds. Dozens of successful medtech companies have emerged from Braga's melting pot of medical research and tech start-ups.

For example, ICVS produced iSurgical3D, a company that uses 3D technology to develop prosthetics and other medical devices. Moreover, students from UMinho created Pickmed, a software development company that assists surgeons in navigating musculoskeletal surgeries, while Clarik is a start-up offering the automated diagnosis of neurodegenerative diseases through artificial intelligence-based neuroimaging biomarkers.

Both Pickmed and Clarik were supported by Startup Braga,

an incubator set up by Braga Municipality.

Nanotech leader

Braga is also the hub for nanotechnology, both in Portugal and the wider Iberian peninsula. The International Iberian Nanotechnology Laboratory (INL) was founded in the city a decade ago by the Spanish and Portuguese governments, and is the third inter-governmental laboratory in the world, after Geneva's CERN and Heidelberg's EMBL.

INL was opened in Braga partly due to the city's strength in advanced manufacturing, such as in medtech, according to Lars Montelius, INL director-general. This international and interdisciplinary laboratory hosts 300 researchers from 30 countries (plus 100 students) from the chemistry, medicine, biology, physics and engineering fields, who work together to create cutting-edge nanotechnology research, applications and devices, and deploy them as quickly as possible, he adds.

For three consecutive years, INL and UMinho have submitted more patents to the European Patent Office than any institution in Portugal. "We work with companies worldwide, and the Braga start-up ecosystem, to introduce nanotechnology into their product or services. You don't need to be a specialist in nanotechnology; if you have a great idea, you [can] come to us and we create the nanotech in our commercial and industrial-grade lab," says Mr Montelius.

INL incubates its own spin-off companies, such as Rubinomed, which uses nanotech to identify cancer cells. It also works with Bosch's Braga facility, relating to autonomous vehicle research, and

with UMinho, especially within quantum computing in a project linked with IBM.

"The innovation ecosystem is vibrating, boiling in Braga. It's a really nice spot for new companies coming up. I'm from Sweden and have started companies myself. The speed of development is very quick here," says Mr Montelius.

Climate change

UMinho's new Institute of Bio-sustainability (IBS) is another multidisciplinary research centre that works closely with companies, albeit in clean tech. IBS runs numerous research projects, such as Nexiproject, aimed at developing new sensors to measure biological and physical variables in the sea, such as acidity and turbidity.

One of its partner companies is the DST Group. Unlike the region's other major construction companies, it survived the financial crisis thanks to its diversification across renewable energy, water distribution, telecoms, 'smart city' real estate and venture capital, DST Group employs 1600 people in total.

The company's venture capital arm, Three Partner, funds start-ups at Startup Braga and beyond. The company's innovation ecosystem currently has 90 projects, and success stories include Levels, a company founded by UMinho researchers that gauges the risk of rock-fall from cliffs.

In partnership with INL, DST also invested in Spherephotonics, a company that uses ultra-fast lasers in microscopy to detect cancer cells at a very early stage. Companies such as DST are just one example of the talent bonanza found in Braga, and explain how the city manages to outperform many other European cities of its size. ■

THE INNOVATION ECOSYSTEM IS VIBRATING,
BOILING IN BRAGA. IT'S A REALLY NICE SPOT
FOR NEW COMPANIES COMING UP

