BBVA Research

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Investment in intangible assets in Spain: An analysis with transactional data

Key points

This study presents an innovative use case: the use of recurring invoice payment data to estimate and analyze sales and purchase flows between companies.

It shows how this information – little exploited until now – is a valuable input to measure intangible business activity.

More than 250,000 anonymized banking transactions of 37,000 BBVA client companies between 2019 and 2024 are analyzed, and an indicator of investment in intangible assets is constructed. In addition, it provides insight into who is selling, who is buying and where, something has so far been impossible to capture with traditional statistics.

Intangible assets are an engine of economic growth, as they improve productivity.

Its importance is growing, as it boosts the growth prospects of companies that prioritize this type of investment and can help close the growth gaps between the Spanish economy and the eurozone.

The analysis shows that the sectoral distribution of companies operating with BBVA is similar to the national average.

The validation of its representativeness reinforces the importance of financial data as a useful source of information for the measurement and study of production and investment dynamics at the national level.

The data on banking transactions, consistent with those of the INE in aggregate patterns, reveal that IT services, architecture and engineering companies lead business activity.

In terms of size, microbusinesses (with fewer than 10 employees) are the most numerous; however, medium and large companies have a prominent presence in innovative sectors such as IT, architecture and R&D.

Key points

Based on the transaction data, a time series is constructed that measures the evolution of investment in intangible assets, in line with the Quarterly National Accounts.

The methodology applied shows a high degree of adjustment, with correlations greater than 0.60 with respect to the official figures.

Breaking down investment by type of asset confirms that—in line with INE data—software and R&D are the main drivers of growth in intangible investment.

The level of detail of the transactions analyzed makes it possible to map investment flows by sector and region and reveals a clear sectoral specialization.

Four asset-sector combinations account for more than half of the total growth in intangible assets: R&D mainly to companies in the same sector; film, radio, TV and IT to other media and IT companies and software companies in the energy sector.

Sectors showing lower relative dynamism include manufacturing, construction, transportation and the chemical industry.

Four autonomous communities account for more than 70% of innovation spending in the country: Madrid, Catalonia, the Basque Country and the Valencian Community.

These regions stand out for their volume of investment, and for allocating a higher percentage of their GDP to innovation.

When it comes to intangible sales, these regions—along with Andalusia—are leading output.

Sales flows between regions show that the commercialization of intangible assets tends to be local, except in the case of R&D, which shows greater interregional mobility.

1.Motivation

Why is investing in intangible assets important?

It is a driver of growth:

R&D, software, human capital and branding account for an essential part of productivity and value creation in the digital economy (Bontadini, et al., 2024).

It is estimated that one-fifth of the growth in investment in intangibles is transferred to increases in total factor productivity (Corrado et al., 2022).

The global economy is "dematerializing":

Between 2008 and 2013, intangible capital—technology, intellectual property, etc.—grew almost three times faster than physical capital. Companies are redefining their investment priorities to adapt to this new reality (WIPO, 2024).

Investing in intangible assets pays off:

A more intensive use of intangible capital seems to be associated with higher revenues, higher customer satisfaction (Chappell & Jaffe, 2018) and even higher productivity (Kaus, et al., 2024).

It can reduce growth gaps:

In Europe, evidence has been found that the growth gap with the United States can be attributed to a lag in the momentum of the knowledge economy (Van Ark et al., 2008)

They are a strategy in the face of uncertainty:

During the pandemic, many companies maintained or even reinforced their commitment to intangibles. This suggests that, in addition to being a lever for growth, they represent a form of resilience against economic shocks (WIPO, 2024).

A strategic challenge in Europe:

Closing the gap in intangible investment

Europe invests less in intangible assets than the U.S. In 2023, 21% of total investment in the EU went to intangible assets, compared to 35% in the U.S. **This difference explains part of the productivity gap between the two regions**, especially in technology-intensive sectors (Gordon and Sayed, 2020).

Europe tends to focus on incremental improvements in mature technologies, which limits disruption and the ability to generate new sources of growth. This is the so-called "intermediate technology trap" (Fuest et al. ,2024).

In the EU, **technological creation has declined in the high-tech manufacturing industry, the traditional engine of productivity**. Technology in the service sector has accelerated, but only the most advanced companies seem to benefit from this progress (ECB, 2021).

Regulatory fragmentation, over-regulation, and restrictions on access to data and markets raise costs for tech companies, limit competition and reduce the carry-over effect of innovation (Filip et al., 2025).

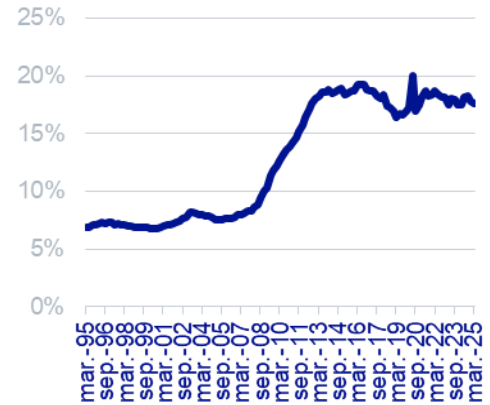
European tech startups rely more on equity capital or venture capital (VC) than on bank financing, but the European venture capital market remains small. This makes it difficult for innovative companies to grow and compete on a global scale (ECB, 2021).

Investment in intangible assets in Spain

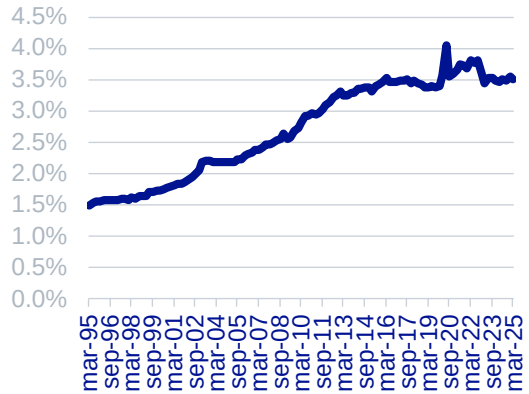
It grew at a faster rate than materials between 1995 and 2015, but its dynamism has slowed down since then…

INTANGIBLE FIXED ASSETS

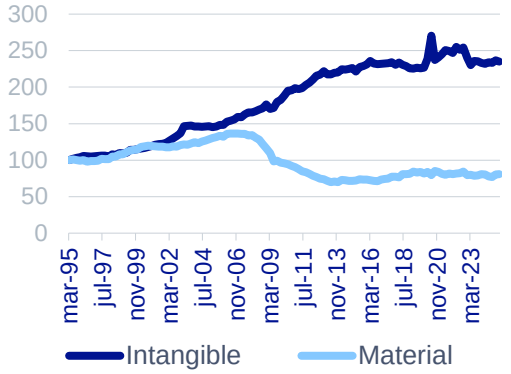
% OF GFCF



% OF GDP



INTANGIBLE & MATERIAL FIXED ASSETS (% OF GDP MAR 95=100)

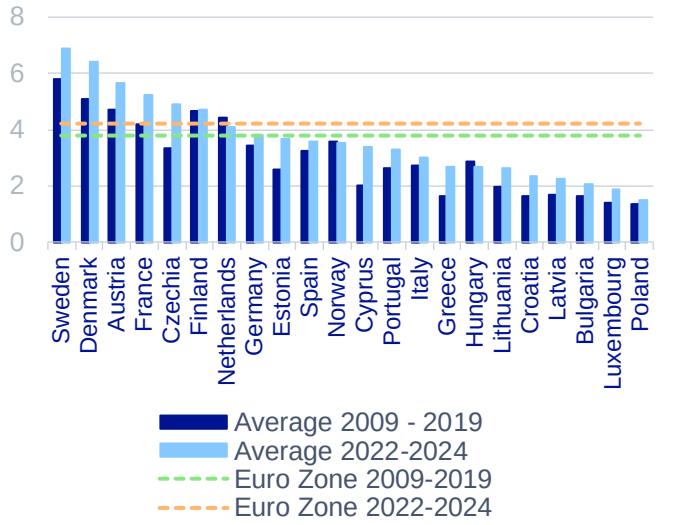


Source: BBVA Research with data from INE

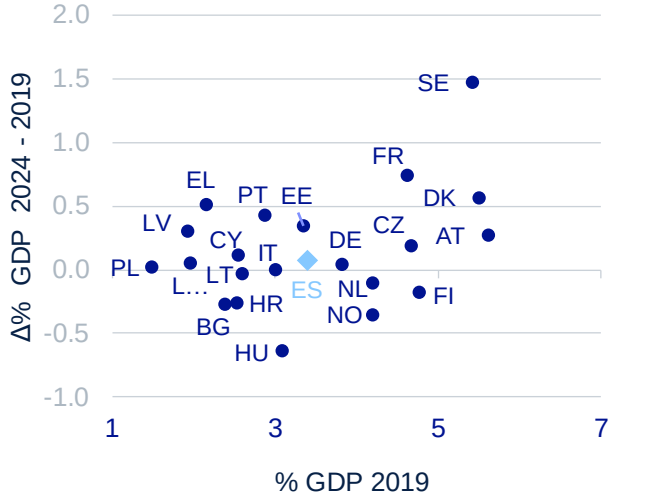
Among the reasons that the literature highlights to explain this behavior are: the stagnation of public investment in this area, as well as regional and sectoral heterogeneity, as only three autonomous communities of Spain and two sectors of activity (private services and construction) invest above the Spanish national average **(Mas, et al. 2024)**

… although it is still in an intermediate position compared to other EU countries

INVESTMENT IN INTANGIBLE ASSETS
(% OF GDP SA DATA)



INTANGIBLE ASSETS AS % OF GDP
(2019 AND CHANGE 2024-2019)



Source: BBVA Research with data from Eurostat

Beyond the official statistics:

The value of granular data

Although official data make it possible to follow the major trends and place Spain in the international context, there is a need for tools that capture in real time who is investing, what they are investing in, where and with what intensity.

The level of detail and the frequency of BBVA's **transactional data makes it possible to observe patterns of investment in intangibles by sector, region and company size**, offering key insights for the design of more effective and targeted policies.

As shown in the following sections, **not all regions or sectors have the same dynamism**. The granularity of the data makes it possible to observe this regional and sectoral heterogeneity and to identify both the most intensive and the lagging areas.

This level of detail is not possible to observe with traditional sources, so BBVA customer data provides **a unique snapshot of the Spanish** intangible ecosystem.

During the pandemic or with regulatory changes, official data lags. **Banking data allows for almost instant identification of who is investing, in what and where. This is impossible with traditional statistics.**

They could incorporate additional components identified by the literature (see Appendix) that are currently omitted by official measurements, which could raise Spanish GDP by an additional 4.4% (Ivie and Cotec, 2023).

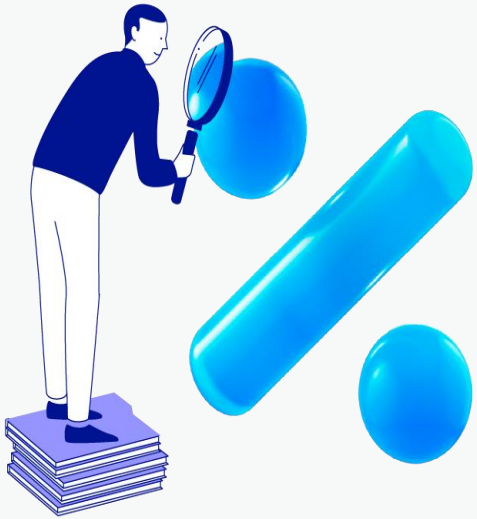
2. Representativeness of BBVA data

Financial transactions of companies at BBVA

- The financial transactions used in this analysis are **transfers and confirming operations [1/] that companies carry out through BBVA accounts, specifically for the purpose of paying invoices. These transactions can be considered approximations of sales and purchases.**
- To identify invoice payments made via transfers, as well as the originating and receiving companies, **natural language processing techniques are applied to the text fields describing the transfer, allowing for the identification of both the issuing company and its counterparty** — whether or not they are BBVA clients.
- In the case of confirming operations, **information is available from the outset on both the issuer and the recipient of the invoice**, who may or may not be customers of the bank.

1 Confirming is a financing product that allows companies to manage the collection of invoices issued to their customers through the bank. In addition to management, the company that hires this service can request advances on these invoices at a relatively lower financing cost.

Financial transactions of companies at BBVA



- When a **BBVA client company receives a payment from another company (whether a BBVA client or not) for an invoice** [1], either via transfer or through confirming, it is considered a **sale**. When a **BBVA client company issues a payment to another company** (whether a BBVA client or not), it is considered a **purchase**.
- In total, the analysis covers **information from 250,000 transfer and confirming transactions carried out by 37,000 companies** from sectors considered producers of intangible assets during the period from January 2019 to December 2024.
- Companies whose CNAE are included in the INE's synthetic indicator of investment in intangibles are identified as **producers of intangible assets**. These CNAE codes are in turn grouped according to the Classification of Products by Activity in order to assess the representativeness of BBVA data against the INE's Input-Output Tables (see Appendix).

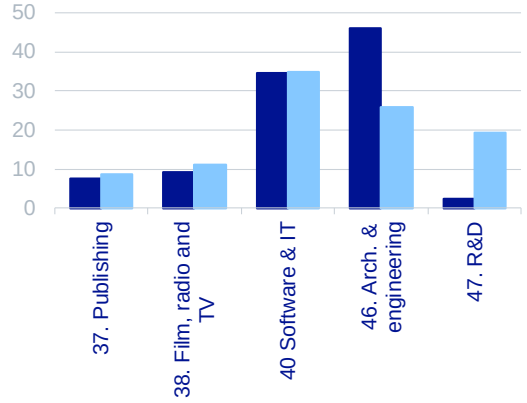
1 Both in the transfer data and in the confirming data, an additional cleaning process is performed to avoid including transactions between companies within the same group.

The representativeness of BBVA data is adequate

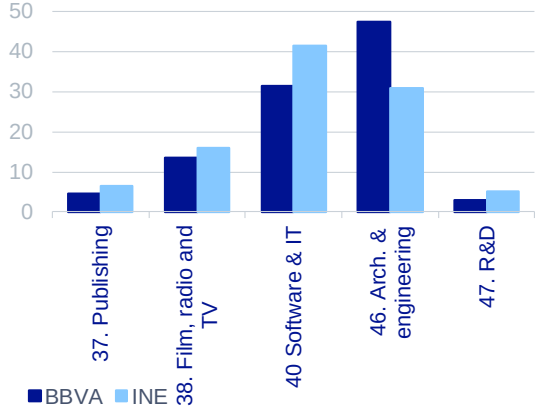
The sector breakdown of the client companies is similar to the national distribution

DISTRIBUTION BY SECTORIAL ACTIVITY 2019-2022

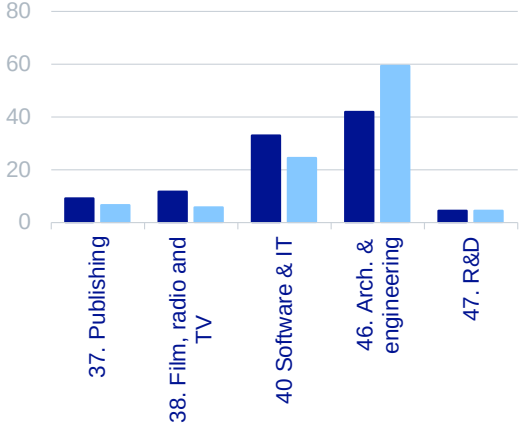
SALES TO OTHER FIRMS (%)



PURCHASES TO OTHER FIRMS (%)



NUMBER OF FIRMS (%)



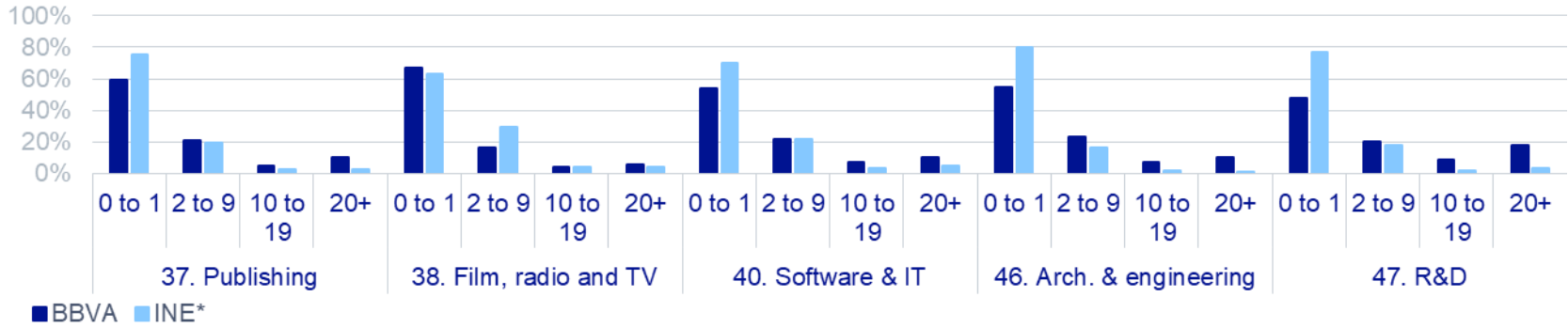
Source: BBVA Research with data from BBVA and INE (Input-Output Tables and Harmonized Business Demography)

Both INE data and BBVA transaction data show that the architecture and engineering, as well as programming and IT (software) sectors, account for more than half of total company sales and purchases.
This highlights their key role as both providers and consumers within the intangible assets ecosystem.

The representativeness of BBVA data is adequate

The correlation of the distribution by company size is 0.95

DISTRIBUTION OF THE NUMBER OF COMPANIES BY NUMBER OF EMPLOYEES 2024
(% OF TOTAL IN EACH SECTOR)



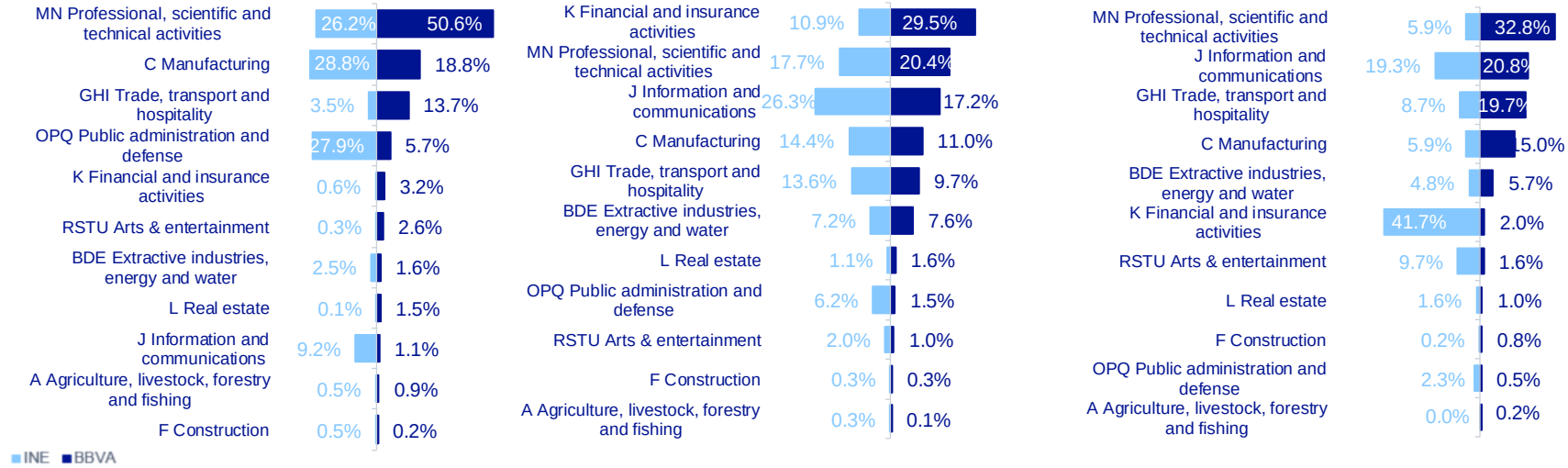
*INE data corresponds to 2023
Source: BBVA Research with data from BBVA and INE (Structural Business Statistics)

In both BBVA and INE data, companies with fewer than 10 employees are the most numerous. Innovative sectors such as IT, architecture and R&D stand out for a relatively larger presence of SMEs and large companies in the customer portfolio.

The representativeness of BBVA data is adequate

Both sources show a similar composition of R&D and software expenditure

DISTRIBUTION OF INTANGIBLE EXPENDITURE BY PURCHASING SECTOR AND TYPE OF ASSET



Source: BBVA Research with data from BBVA and INE (CNA)

Who buys intangible assets? The main buyers of R&D services are the professional and scientific sectors, while the financial and information and communications sectors demand software.

3. Methodology and results

Building a real-time investment indicator

The adequate representativeness of the data reinforces the added value of banking transactions to study investment in intangibles and allows the construction of an indicator that follows its development in line with the national accounts.

Objective: to estimate investment spending by business sector and asset type based on BBVA banking transactions, correcting for biases and ensuring consistency with the national accounts (input-output tables from the INE).

Methodology:

Data used:

- Sales between companies through BBVA transactions, classified by sector of economic activity of the buyer and seller
- Origin-Destination Tables (INE): intermediate consumption (IC) and investment between products and branches of activity (sectors).

Calculation of BBA coverage: for each sector of activity i, a coverage factor is calculated, defined as the total sales observed in BBVA data relative to the sum of intermediate consumption and investment reported by the INE (see formula 1 in the Methodological Appendix).

Investment Identification: For each sale from sector *i* to *j*, it is determined whether it can be considered an investment when the percentage of that sale with respect to the total of sector i BBVA data is greater than or equal to the share of IC observed in the INE data. This is true as long as the investment in the INE data is positive (formula 2).

Scaling Adjustment: to maintain consistency with the total amounts of the INE in each sector, an adjustment factor is calculated that scales the level of sales observed in the BBVA data to the national total (formula 3).

Estimated investment: obtained as the difference between the total BBVA scaled sales and the ICs observed in the INE data (formula 4).

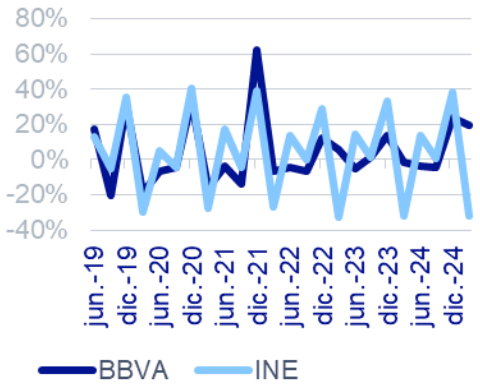
The percentage of BBVA sales that are investments can also be obtained (formula 5).

The methodology used closely follows the official investment in intangibles

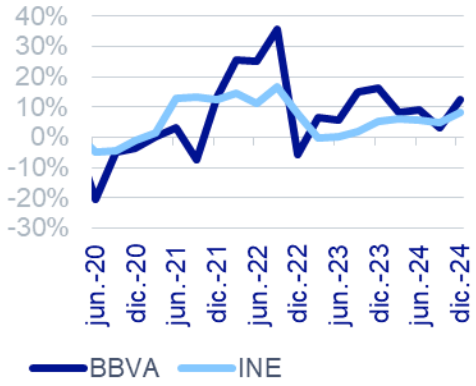
Correlations above 0.60 show that the series constructed with transaction data has a good fit with the official figures.

INVESTMENT IN INTANGIBLES BBVA VS INE

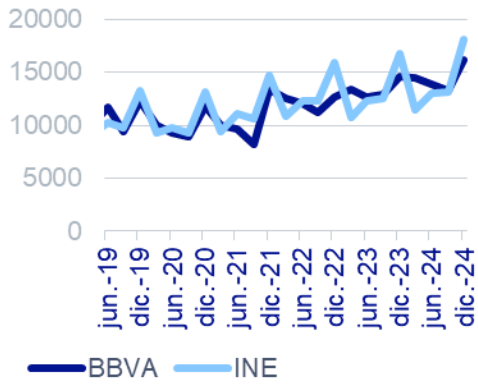
(% NOMINAL QUARTERLY NOT SA)



(% YEAR OVER YEAR NOT SA)



(MILLION EUROS NOT SA)



QoQ correlations

2019Q2 - 2024Q4: 0.71

2021Q1 - 2024Q4: 0.61

YoY correlations

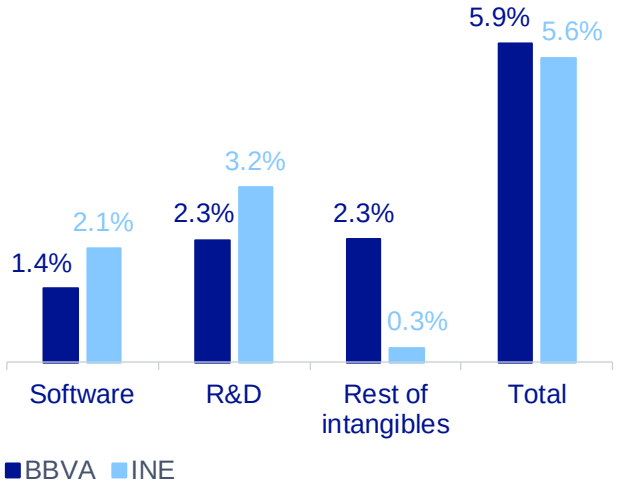
2020Q1 - 2024Q4: 0.62

2022Q1 - 2024Q4: 0.69

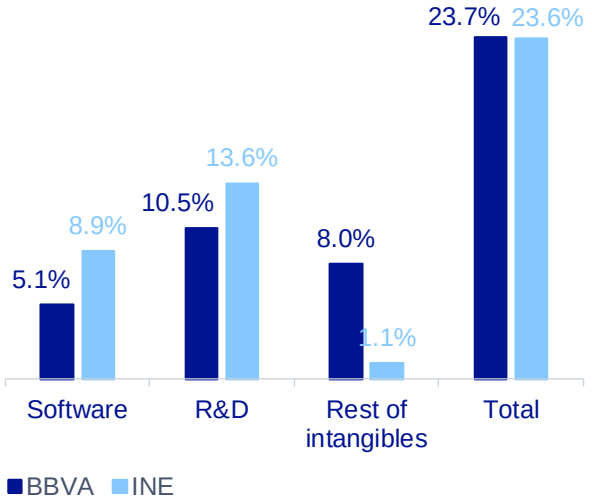
Source: BBVA Research using data from BBVA and INE (QNA)

By asset type, both BBVA and INE highlight software and R&D as the main drivers of growth in intangible investment

AVERAGE ANNUAL TOTAL GROWTH AND CONTRIBUTION BY ASSET TYPE 2020–2023 (%)



CUMULATIVE GROWTH AND CONTRIBUTION BY ASSET TYPE 2020–2023 (%)

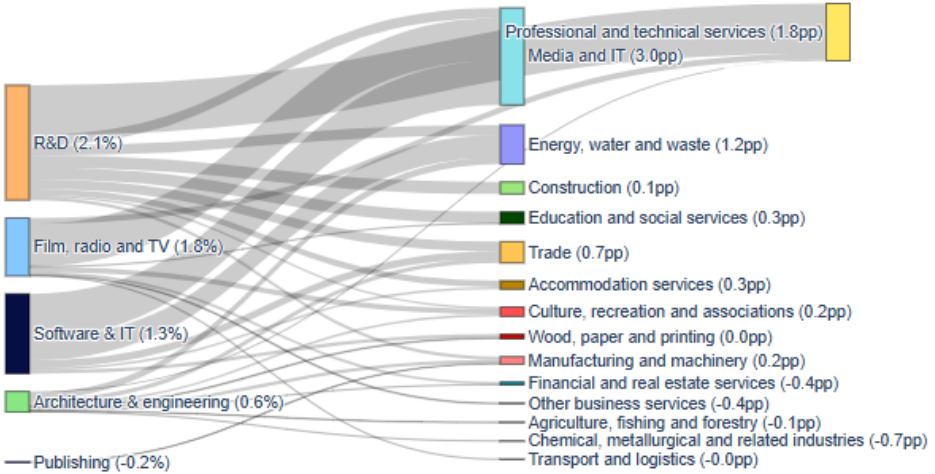


Source: BBVA Research using data from BBVA and INE (QNA)

The granularity of the data shows that this investment is driven by sector-specific demands

- **The chart shows the sectors (on the right) that are driving investment in intangible assets** and what type of assets each specializes in (on the left). **This allows for the identification of sectoral specialization patterns.**
- **More than half of the aggregate growth in intangible assets is concentrated in four asset-sector combinations**: R&D to professional and technical services (other R&D companies); film, radio and TV and IT to other media and IT companies; IT companies that sell their services to the energy sector.
- **Other sectors show low or no investment in intangible assets, which points to significant gaps between sectors.** In some cases, such as manufacturing and construction, the contribution is low; in others, such as in transport and the chemical industry, is even negative. **This points out to opportunities for modernization in these sectors.**

SALES FLOWS BETWEEN TYPES OF INTANGIBLE ASSETS AND ACTIVITY SECTORES (CONTRIBUTIONS TO TOTAL GROWTH 2020 - 2023, PERCENTAGE POINTS)

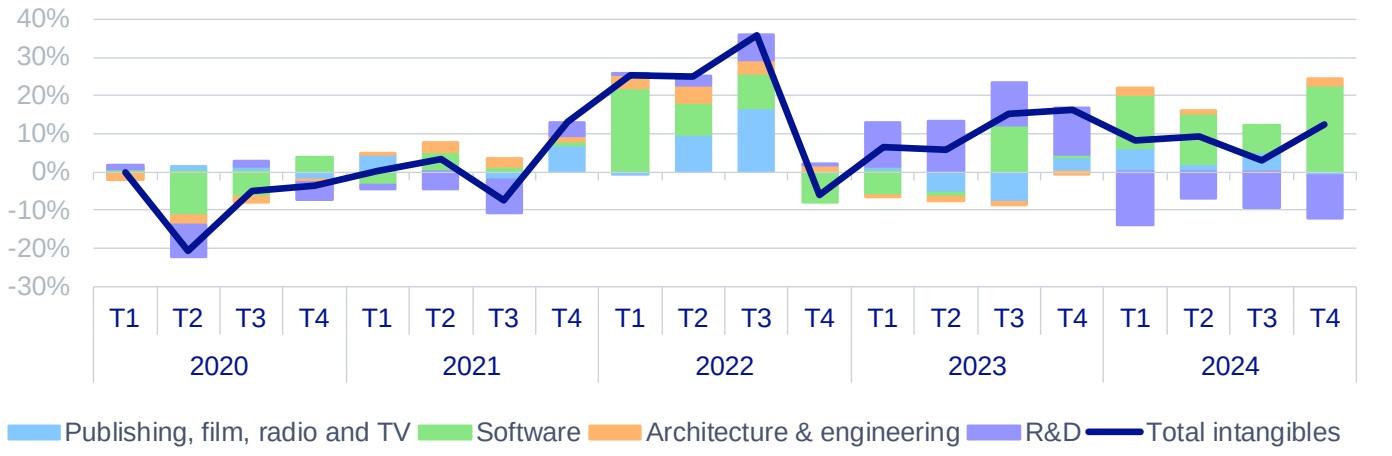


Source: BBVA Research with data from BBVA

The BBVA indicator shows that investment in intangible assets was driven by R&D in 2023 and by software companies in 2024

INVESTMENT IN INTANGIBLES BBVA CLIENTS BY SECTOR

NOMINAL YEAR-ON-YEAR GROWTH IN % AND CONTRIBUTION IN PP, NON-SEASONALLY ADJUSTED



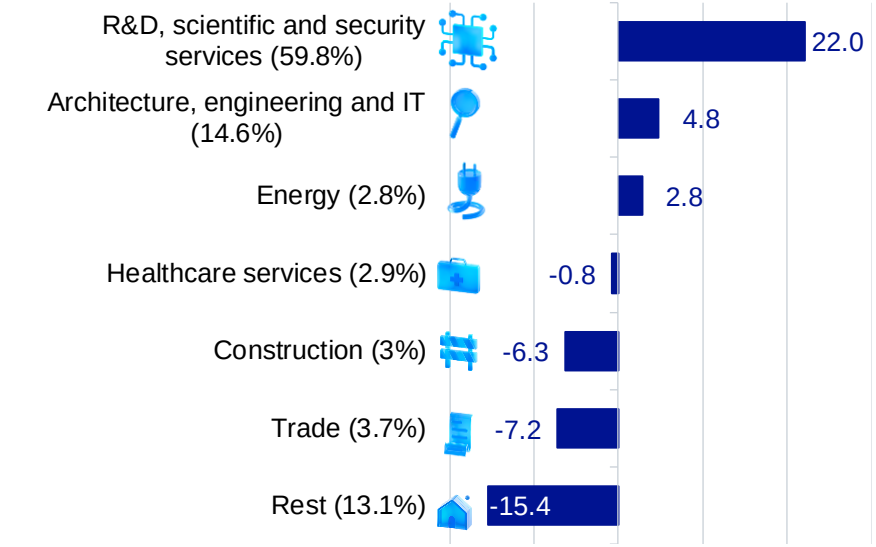
Source: BBVA Research with data from BBVA and INE (QNA)

R&D companies offer diverse solutions

They range from innovation in sustainable technologies to the creation of drones and medical research, being in demand in different fields

- A more detailed look at the R&D sector companies with the highest transaction volumes through BBVA shows that their core business involves: **development of technologies for water treatment, monitoring of electrical infrastructure, biodegradable products, software development, surveying and development of drones and medical research.**
- These companies' main clients include companies in the same sector, such as clinical research centers, but also architectural companies, electrical companies, pharmaceuticals, food producers and more.

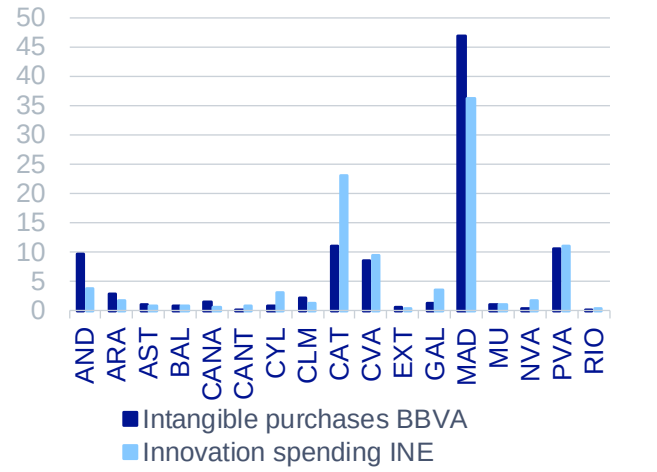
PURCHASES OF R&D BY SECTOR THROUGH BBVA ACCOUNTS (CHANGE IN PP COMPARED TO 2019*)



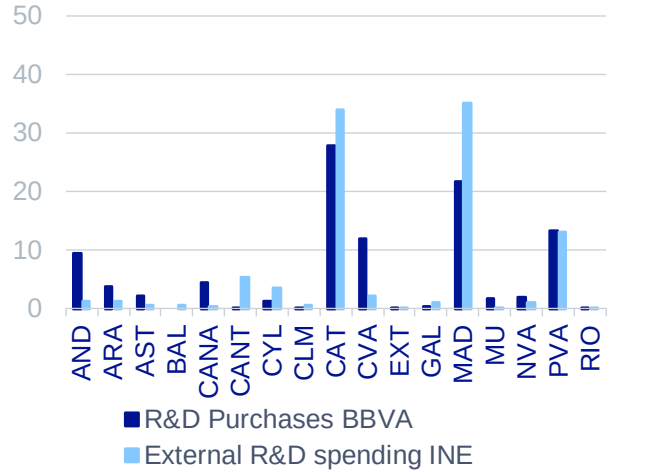
Source: BBVA Research with data from BBVA

Companies with the highest spending on innovation and intangibles are concentrated in four regions: Madrid, Catalonia, the Basque Country, and Valencia

INNOVATION SPENDING AND INTANGIBLE PURCHASES BY REGION 2022
(% OF TOTAL)



EXTERNAL R&D SPENDING AND R&D PURCHASES BY REGION 2022
(% DEL TOTAL)

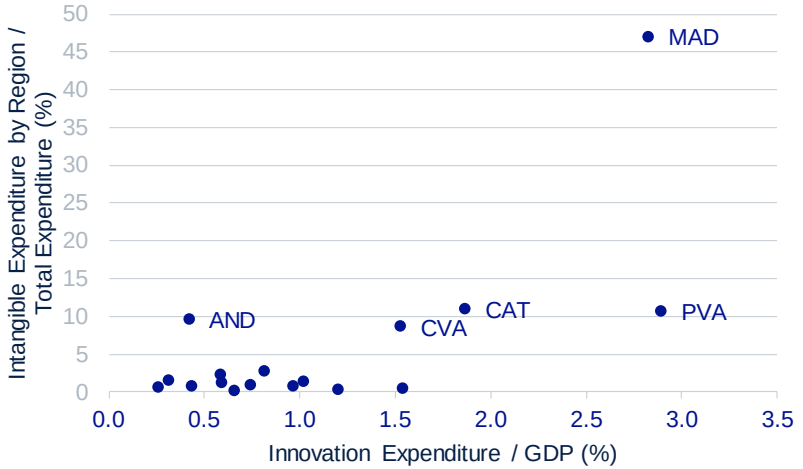


BBVA Research using data from BBVA and INE (2022 Business Innovation Survey).

These four communities also stand out for allocating a higher percentage of their GDP to innovation…

- The expense on innovation in **the Basque Country (2.9%) and Madrid (2.8%) with respect to their GDP is almost double that of the national (1.5%)** and higher than the European average for R&D spending in 2022 (2.2%)*.
- **Catalonia and the Valencian Community** show a strong commitment to innovation and a significant share of intangible investment.
- **The positive relationship** between innovation spending and the share of intangibles reveals gaps between regions.
- **Andalusia stands out for its volume of expense on intangibles**, although its relative effort in innovation (as a proportion of GDP) is still low, which suggests room to improve innovative efficiency.

INNOVATION EXPENDITURE AS % OF GDP AND SHARE OF INTANGIBLE EXPENDITURE BY REGION 2022



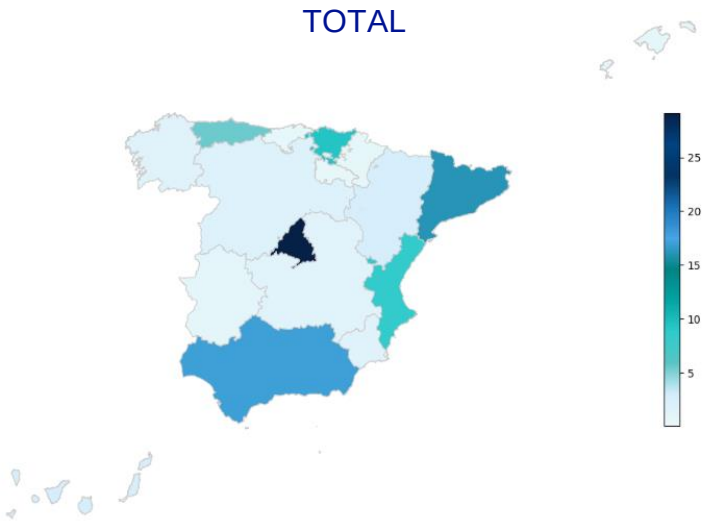
*Source: Eurostat

Source: BBVA Research with data from BBVA and INE (Regional Accounts)

… and because they are also the main producers of intangible assets…

- **Madrid leads in concentration of sales volume** (29%). Catalonia leads in number of companies (see Appendix).
- **The vast remaining majority (56%) is concentrated in five autonomous communities:** Andalusia, Catalonia, the Valencian Community, the Basque Country and Asturias.
- Although there may be **differences by asset type** (see next slide), the rest of the country shows a low stake, which appears to **reflect regional gaps in terms of innovation.**
- Policies that encourage the production and investment of intangible assets in regions with low participation could reduce regional inequalities and boost local economies.

RESIDENCE OF COMPANIES PRODUCING INTANGIBLE ASSETS, 2021–2024 (% OF TOTAL SALES)



Source: BBVA Research using data from BBVA

… although some heterogeneity is observed by type of asset

RESIDENCE OF COMPANIES PRODUCING INTANGIBLE ASSETS, 2021–2024
(% OF TOTAL SALES)

SOFTWARE

R&D

REST OF INTANGIBLES

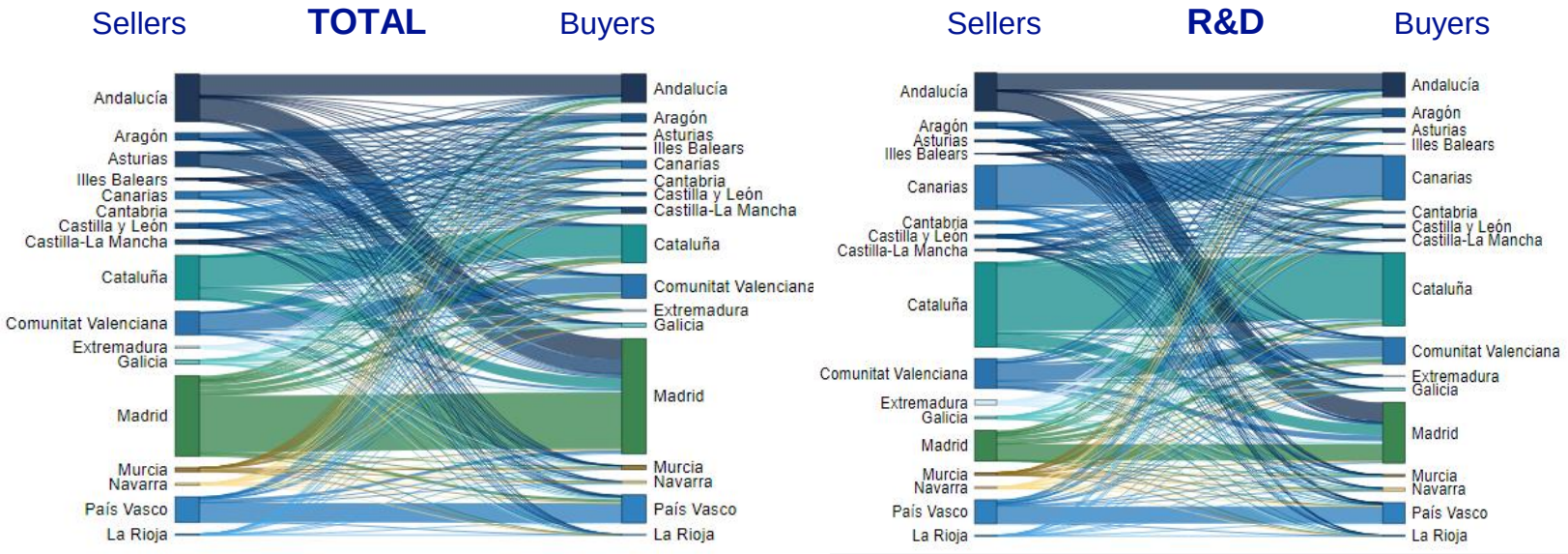
Source: BBVA Research using data from BBVA

Catalonia is the main provider of investment in R&D, but Madrid, Andalusia, Valencia and the Canary Islands also stand out. Madrid and Andalusia lead in the offer of IT services and other intangible assets. Other relevant Autonomous Communities are Valencia, Asturias and the Basque Country. In terms of the number of companies, the regional concentration is similar (see Appendix).

The commercialization of intangibles tends to be local

These graphs illustrate the flow of sales between autonomous communities and show that most intangibles are sold within the same autonomous community. R&D shows a higher level of interregional exchange, with much of it flowing toward Madrid.

SALES OF INTANGIBLE ASSETS BY REGION OF SELLERS AND BUYERS
2021–2024 (% OF TOTAL)



Source: BBVA Research using data from BBVA

Limitations of the analysis

While the use of transactional data brings significant added value, the approach also has some methodological and coverage limitations to consider:

- **Partial coverage of the business sector**: The analysis is based on transactions carried out through BBVA accounts within Spain. Companies with no relationship with BBVA are outside the scope of the study. Nor is the investment demanded by companies outside the country taken into account.
- **Imperfect characteristics of companies:** Although they become the minority (around 2%), some companies may have CNAE codes or number of employees that are ambiguous, outdated or unrepresentative of their actual activity, which can affect the sectoral allocation or their size classification.
- **Lack of comparable official sources:** Not all dimensions of the analysis (e.g., interregional or inter-sector flows) have equivalents in public statistics, which limits external validation.
- **Transactional nature of the data:** Although some structural biases have been corrected, others may persist due to the specific financial behavior of customers (e.g., payment policies, use of accounts in different banks).
- **Indirect estimation of the investment:** the algorithm used makes it possible to estimate investment based on the INE's Origin-Destination Tables, but these do not provide sufficient detail on the sectoral origin and destination of the investment. Therefore, it is estimated as the difference between total sales among companies and intermediate consumption, which introduces an inherent margin of error to the approach.

Despite these limitations, the analysis allows capturing patterns of investment in intangibles that are consistent with official statistics and provides a unique vision due to its granularity, frequency and ability to identify sectoral and regional dynamics in real time.

Key points

This study presents an innovative use case: The use of recurring invoice payment data to estimate and analyze sales and purchase flows between companies.

It shows how this information – little exploited until now – is a valuable input to measure intangible business activity.

More than 250,000 anonymized banking transactions of 37,000 BBVA client companies between 2019 and 2024 are analyzed, and an indicator of investment in intangible assets is constructed. In addition, it provides insight into who is selling, who is buying and where, something has so far been impossible to capture with traditional statistics.

Intangible assets are an engine of economic growth, as they improve productivity.

Its importance is growing, as it boosts the growth prospects of companies that prioritize this type of investment and can help close the growth gaps between the Spanish economy and the eurozone.

The analysis shows that the sectoral distribution of companies operating with BBVA is similar to the national average.

The validation of its representativeness reinforces the importance of financial data as a useful source of information for the measurement and study of production and investment dynamics at the national level.

The data on banking transactions, consistent with those of the INE in aggregate patterns, reveal that IT services, architecture and engineering companies lead business activity.

In terms of size, microbusinesses (with fewer than 10 employees) are the most numerous; however, medium and large companies have a prominent presence in innovative sectors such as IT, architecture and R&D.

Key points

Based on the transaction data, a time series is constructed that measures the evolution of investment in intangible assets, in line with the Quarterly National Accounts.

The methodology applied shows a high degree of adjustment, with correlations greater than 0.60 with respect to the official figures.

Breaking down investment by type of asset confirms that—in line with INE data—software and R&D are the main drivers of growth in intangible investment.

The level of detail of the transactions analyzed makes it possible to map investment flows by sector and region and reveals a clear sectoral specialization.

Four asset-sector combinations account for more than half of the total growth in intangible assets: R&D mainly to companies in the same sector; film, radio, TV and IT to other media and IT companies and software companies in the energy sector.

Sectors showing lower relative dynamism include manufacturing, construction, transportation and the chemical industry.

Four autonomous communities account for more than 70% of innovation spending in the country: Madrid, Catalonia, the Basque Country and the Valencian Community.

These regions stand out for their volume of investment, and for allocating a higher percentage of their GDP to innovation.

When it comes to intangible sales, these regions—along with Andalusia—are leading output.

Sales flows between regions show that the commercialization of intangible assets tends to be local, except in the case of R&D, which shows greater interregional mobility.

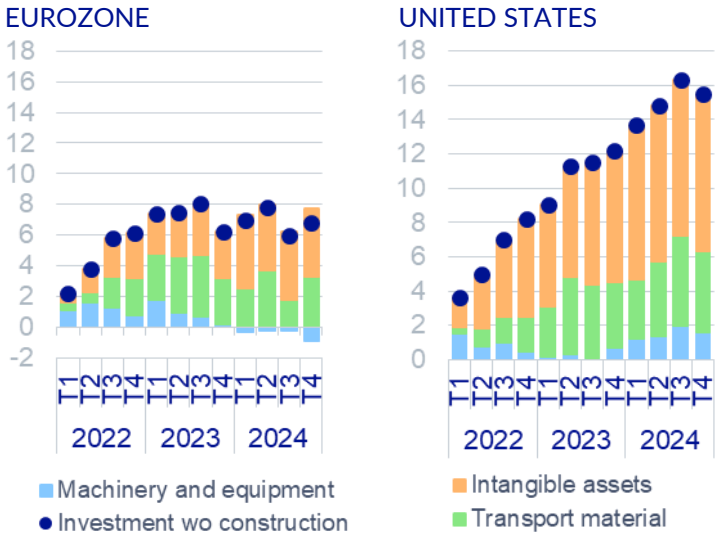
4. Appendices

The growth of investment in intangibles in the EU is relatively low:

only half of the dynamism observed in the U.S. in the post-pandemic period

- In the period from Q4-2021 to Q4-2024, **business investment in the U.S. more than doubled the growth of the EU** (15.4% vs. 6.8%).
- **Investment in intangible assets is the component that has contributed the most to this differential.**
- According to data from the European Investment Bank, **the proportion of companies developing innovations is higher in the U.S. (48%) than in the EU (32%)**[1/].
- There are structural and cyclical reasons behind this lower propensity to innovate among European companies, including: an **overregulation in European markets, higher energy costs and greater uncertainty related to Russia's war in Ukraine.**

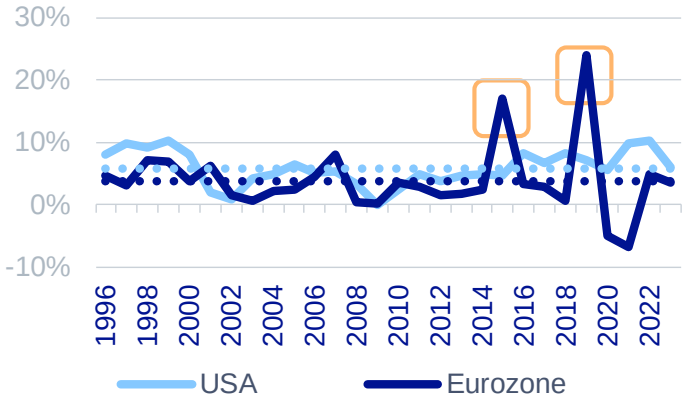
INVESTMENT AND BREAKDOWN BY ASSETS
(%, CUMULATIVE GROWTH RATES AND CONTRIBUTIONS IN PERCENTAGE POINTS)



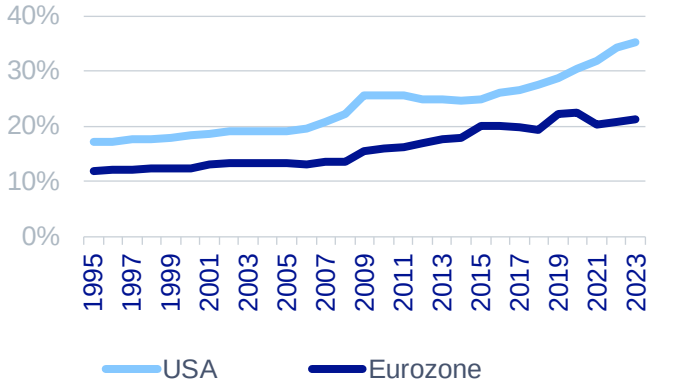
Source: BBVA Research based on ECB data (Boletín Económico No. 2/2025)
[1/] Can be consulted at this link

Historically, investment in intangibles in the U.S. has been higher and more dynamic than in the EU

INVESTMENT IN INTANGIBLES
(YEAR ON YEAR GROWTH, 2020 PPP DOLLARS, %)



INVESTMENT IN INTANGIBLES (PERCENTAGE OF TOTAL INVESTMENT, 2020 PPP DOLLARS, %)



Source: BBVA Research with data from the OECD

The peaks in intangible investment in the Eurozone in 2015 and 2019 are explained by the strategies of multinationals that relocated large intellectual property assets to Ireland, taking advantage of tax incentives.

Descriptive BBVA data

ANNUAL TRANSACTIONS PER CUSTOMER THROUGH BBVA 2019-2024

Sales								
				Euros				Clients
External	Mean	Std	min	25%	50%	75%	max	
37. Publishing	23031	286616	0	331	1409	5813	10723790	2987
38. Film, radio and TV	21185	190554	0	485	1722	6245	9364966	4861
40. Software and IT	27356	281478	-8356	445	2224	9787	13168215	12475
46. Architecture and engineering	28325	378713	2	745	3180	13045	45224565	15359
47. R&D	16089	70694	0	504	2011	8458	2160173	1657

Purchases								
				Euros				Clients
External	mean	std	min	25%	50%	75%	max	
37. Publishing	14807	93984	0	340	1512	6833	4502730	2630
38. Film, radio and TV	32157	328058	1	499	1998	7845	12303838	4189
40. Software and IT	28275	178336	-3107	681	3388	14247	10104177	10189
46. Architecture and engineering	30027	198857	-1222	980	4327	17146	9507008	13117
47. R&D	29324	210541	2	574	2225	10997	7392208	1187

Negative amounts in transactions can occur when there are invoices that are issued to make an accounting adjustment agreed upon by the customer and the supplier (for example, when a customer returns goods to the supplier).

Source: BBVA Research with BBVA data

From official figures to real-time investment and high granularity

In order to identify the sectors that generate intangible assets and assess the representativeness of BBVA's data, a connection is established between them and the official statistics of the INE, as shown in the following diagram:

Definition of sectors in official statistics[1]

Based on the sectors defined by the INE in its National Accounting [1]:

59 Viewers in movie theaters
60 Recorded music market in Spain
58 Book production
Sale of large companies and SMEs by CNAE classification:
62 Programming, consulting, and other IT activities
71 Technical architectural and engineering services
72 R&D

Identification in BBVA data

Financial transactions of the customer companies of the same CNAE are identified

59 Cinematographic, video and television activities
60 Radio and TV programming and broadcasting activities
58 Editing
62 Programming, consulting, and other activities
63 Information services
71 Technical architectural and engineering services
72 R&D

Indicator evaluation and construction

Representativeness is evaluated and the indicator is constructed from the Origin-Destination Tables, grouping the CNAE into CPA products

38 Film services
37 Editing Services
40 Programming and IT
46 Architecture and engineering
47 R&D

1 Source: Manual of Sources and Methods. Available at this link
2 Classification of Products by Activity 2008

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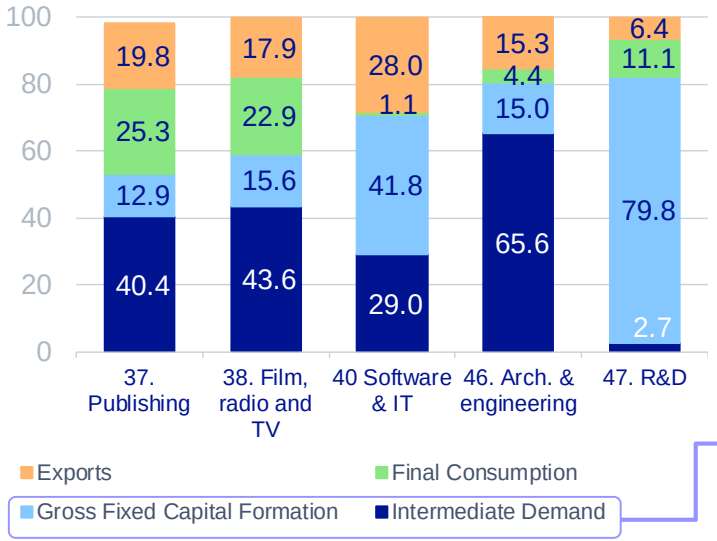
R&D, software and IT sectors allocate most of the demand to investment

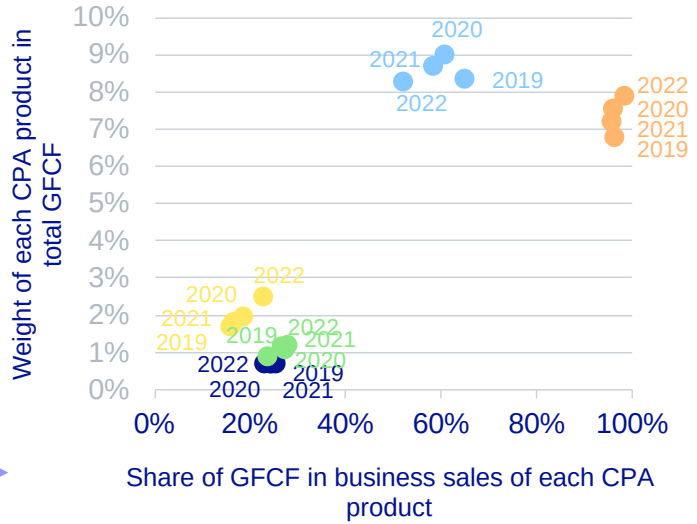
SPAIN: DISTRIBUTION OF OUTPUT BY TYPE OF EMPLOYMENT 2019–2022

(% OF TOTAL SALES)



Domestic sales to companies

SPAIN: SHARE OF GFCF IN EACH SECTOR AND IN TOTAL INVESTMENT



Source: BBVA Research with data from INE (I-O Tables)

Methodology

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Notation	Definition
$V_{i\to j}$	Sales observed in BBVA from sector i to sector j
$M_{i\to j}$	Sales of intermediate goods INE
I_i	Sales of investment goods INE
ϕ_i	BBVA's coverage in sector i
$\eta_i(j)$	Indicator: Does official data show positive investment?
θ_i	Proportionality adjustment in BBVA data
$\tilde{I}_{i\to j}$	Final investment estimate
$\tilde{\delta}_i^j$	Percentage of ia j sales that are considered investment goods

- BBVA's coverage in sector i is defined as:

$$\phi_i = \frac{V_i}{M_i + I_i} \tag{1}$$

- If INE's investment is negative, the data is corrected with an indicator function where:

$$\eta_i(j) = \begin{cases} 1 \; si \;\; V_i^j \dfrac{M_i + I_i}{V_i} - M_i^j \geq 0 \\ 0 \; si \;\; V_i^j \dfrac{M_i + I_i}{V_i} - M_i^j < 0 \end{cases} \tag{2}$$

- To scale up to the national level and correct biases in BBVA data, the adjustment *factor* θ_i is defined as:

$$\theta_i = \frac{I_i}{\sum_{\forall j} \eta_i(j)\left(\frac{V_i^j}{\phi_i} - M_i^j\right)} \leq 1 \tag{3}$$

- The final estimate of the investment is:

$$\text{Si } M_i^j = 0 \rightarrow \tilde{I}_i^j = 0 \quad \text{Otherwise:} \quad \tilde{I}_i^j = \theta_i \eta_i(j)\left(\frac{V_i^j}{\phi_i} - M_i^j\right) \tag{4}$$

- What percentage of sales is investment?

$$\tilde{\delta}_i^j = \frac{\tilde{I}_i^j}{M_i^j \frac{1}{\phi_i}} \tag{5}$$

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Taxonomy of capital intangible assets according to the literature

The specialized literature* proposes three categories and ten types of assets, of which only five are included in official GDP measurements

Digitized Information

- Software
- Databases

Innovative Property

- R&D
- Mineral exploration
- Artistic, entertainment and literary originals
- Registered designs (industrial)
- Financial product development

Economic Competencies

- Market and brand research
- Operating models, platforms, supply chains, and distribution networks
- Employer-provided training

● INCLUDED IN OFFICIAL GDP MEASUREMENT

*Corrado, C., Hulten, C., & Sichel, D. (2005). Measuring capital and technology: an expanded framework. In Measuring capital in the new economy (pp. 11-46). (2009). Intangible capital and US economic growth. Review of income and wealth, 55(3), 661-685.
Source: Corrado C., Charles Hulten and Daniel Sichel (2005, 2009)

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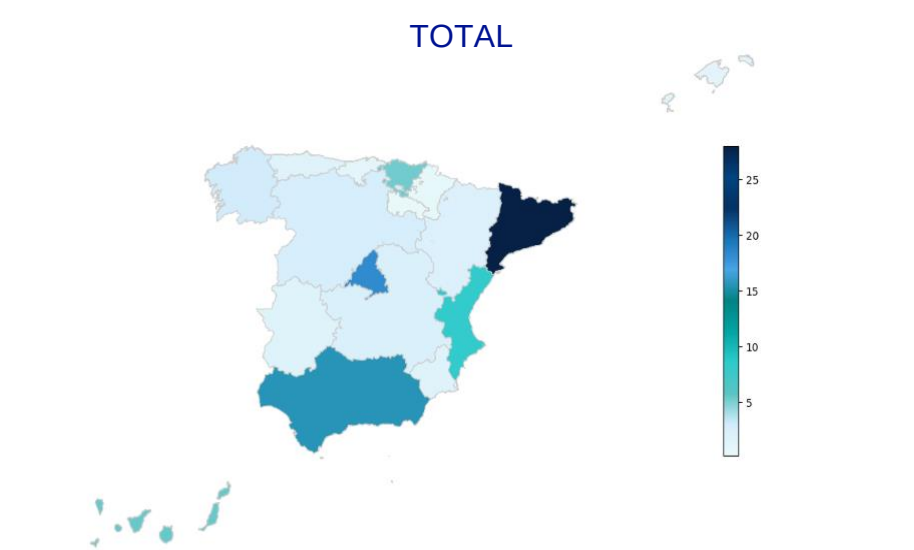
In terms of the number of companies, the regional concentration is similar

RESIDENCE OF COMPANIES PRODUCING INTANGIBLE ASSETS 2021–2024 (% OF NUMBER OF COMPANIES)



Source: BBVA Research with data from BBVA

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In terms of the number of companies, the regional concentration is similar

RESIDENCE OF COMPANIES PRODUCING INTANGIBLE ASSETS 2021–2024
(% OF NUMBER OF COMPANIES)

Source: BBVA Research with data from BBVA

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