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# DATA ANALYSIS FOR UNIVERSITY

The HackerStreet Boys





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## PROBLEM STATEMENT

What business problem am I trying to solve?

02

## DATA COLLECTING

What kind of data I need for analysis?

03

## DATA CLEANING

What are the most important data among those collected?

04

## DATA ANALYSIS

What can I say about this data?





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01

# PROBLEM STATEMENT

Understand business and business goals





# PROBLEM STATEMENT

The various analysis are oriented to the research of trends related to the enrollment of students in the different courses of study, based on demography, background and employment opportunities





# PROS VS CONS



## LOTS OF DATA

You have a large amount of data, all useful for different purposes...

# VS

## LOW INFORMATION

... but not all of it contains interesting information to analyse





# METHODS, TECHNIQUES AND TOOLS

The process was based on three  
fundamental steps:



Identify the state of the art



Predict data trends



Find ways to manipulate what will be





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# METHODS, TECHNIQUES AND TOOLS



Google Colab



Pandas

Excel



PowerBI

Folium





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02

# DATA COLLECTION

Collecting and aggregate data







# DATA SOURCES



## THIRD-PARTY DATA

Open datasets owned by organizations such as MIUR and ISTAT



## QUANTITATIVE DATA

Numerical values concerning percentages and absolute values of enrolled students, graduates, etc.



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# DATA COLLECTION



## OPEN DATA

Gathering of the most interesting collections



Not only data on students, but also territory and demography



Time series of all kinds concerning enrolments, graduates, etc.





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03

# DATA CLEANING

Delete superfluous data





# DATA CLEANING PROCESS

## FILTER ERRORS

Removing errors, duplicates or outliers

01



02

## REMOVE UNWANTED

Filter the observations that have no bearing for the analysis



03

## BRINGING STRUCTURE

Fixing typos and layout issues

## FILLING IN

If exists some gaps, fill it with other data

04





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04

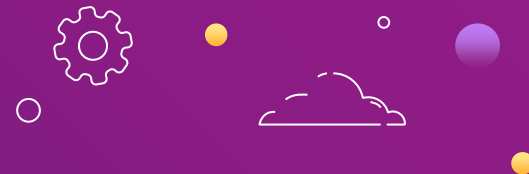
# DATA ANALYSIS

Extraction of the information from data



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# TYPES OF DATA ANALYSIS



## DESCRIPTIVE

Identifies what has already happened



## DIAGNOSTIC

Understanding why something has happened



## PREDICTIVE

Identifies future trends based on historical data



## PRESCRIPTIVE

Make some recommendation for the future





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# DESCRIPTIVE ANALYSIS





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# SOME NUMBERS

98

UNIVERSITIES  
now active in Italy

UNIVERSITIES  
in southern Italy only

25

35

UNIVERSITIES  
have a catchment area of  
more than 20,000 students





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# UNIVERSITY COMPOSITION



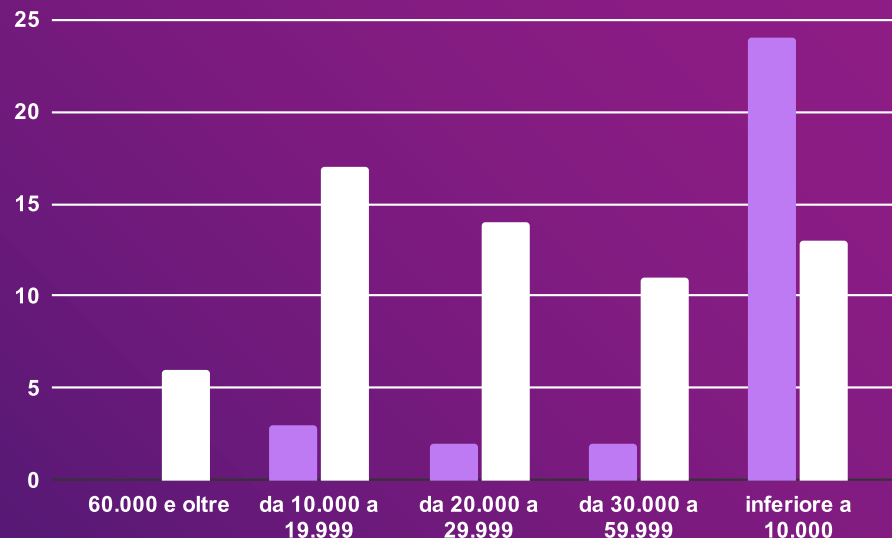
## NON-STATE UNIVERSITY

The majority of non-state universities have a catchment area of no more than 10,000 people



## STATE UNIVERSITY

Only a few state universities exceed 60,000 people

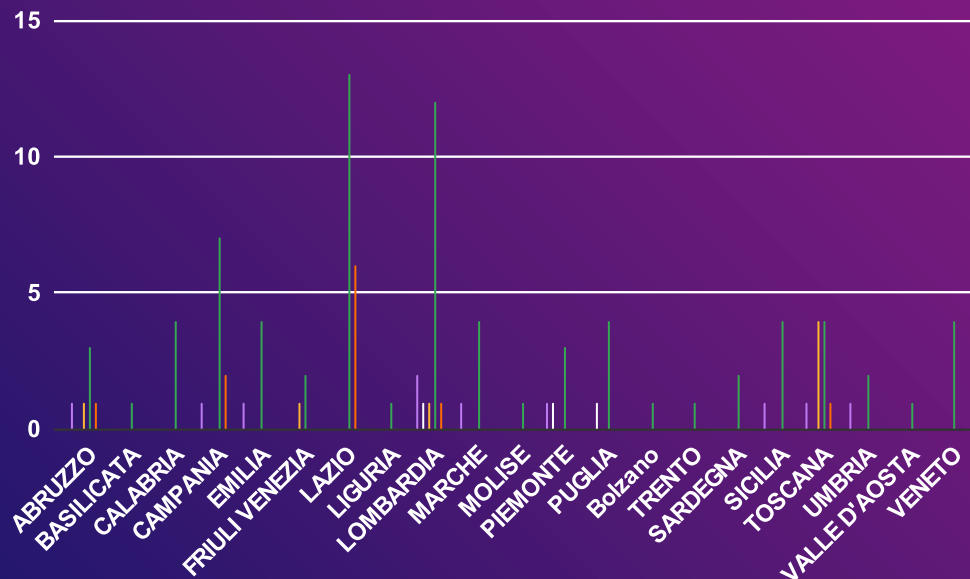


Source: ISTAT



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# UNIVERSITY COMPOSITION



Source: ISTAT



## STATE UNIVERSITIES



Lazio is the first region for state universities, followed by Lombardy

## TELEMATIC UNIVERSITIES



Abruzzo, Campania, Lazio, Lombardia and Toscana are the only to have it

## SPECIAL-ORDER SCHOOLS



Tuscany is the best region for number of special-order schools

## POLYTECHNICS

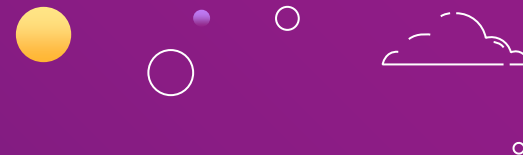


Only Lombardy, Piemonte and Puglia have just one of it



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# REGION PER UNIVERSITIES



17.4%

Lazio is the region  
with most universities

15.6%

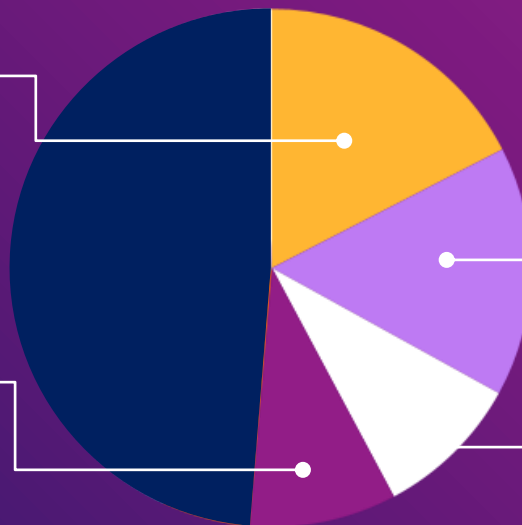
Lombardy is the  
second for universities

9.2%

Campania ranks 4th for  
number of universities

9.2%

Tuscany is the third,  
tie with Campania





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3,490.000

..and more students enrolled since 2010



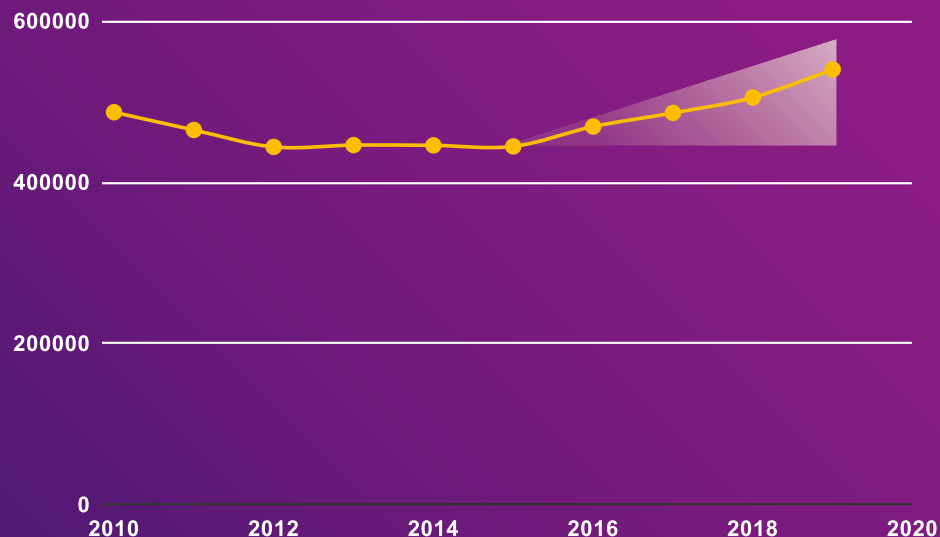
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# FIRST-YEAR ENTRANTS



## ENROLLMENT

The number of enrolments in the first academic year shows an upward trend since 2015

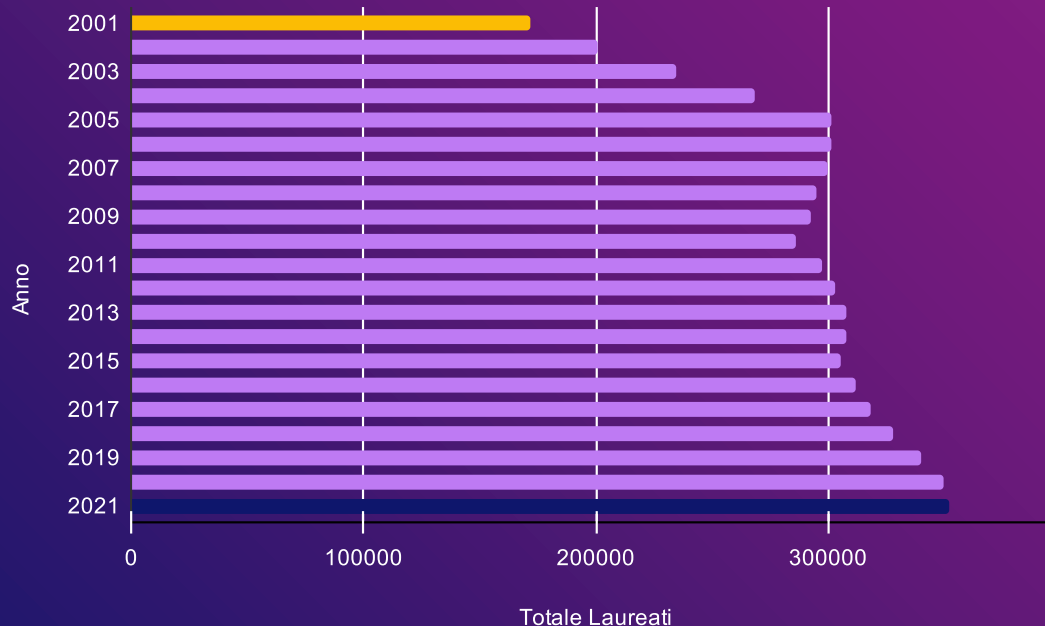


Source: MIUR





# GRADUATES PER YEARS



The total number of graduates is up sharply compared to the figures of a few years ago

Source: MIUR



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# REGION ENROLLMENT

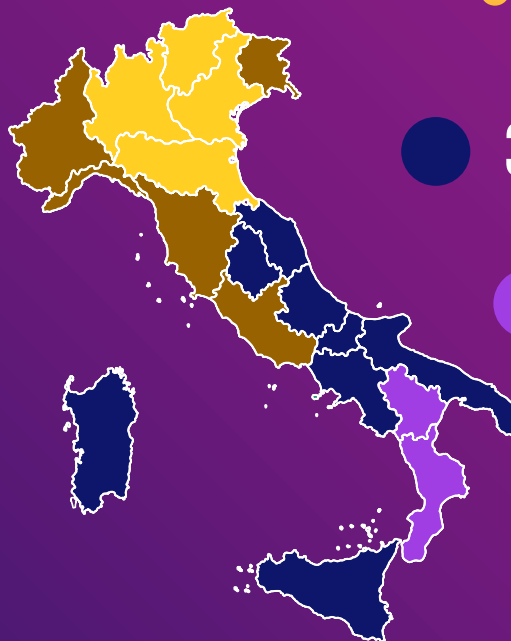
The percentages are calculated according to the population of the region

LESS THAN 2.5% 

2.5% TO 3% 

 3% TO 4%

 MORE THAN 4%



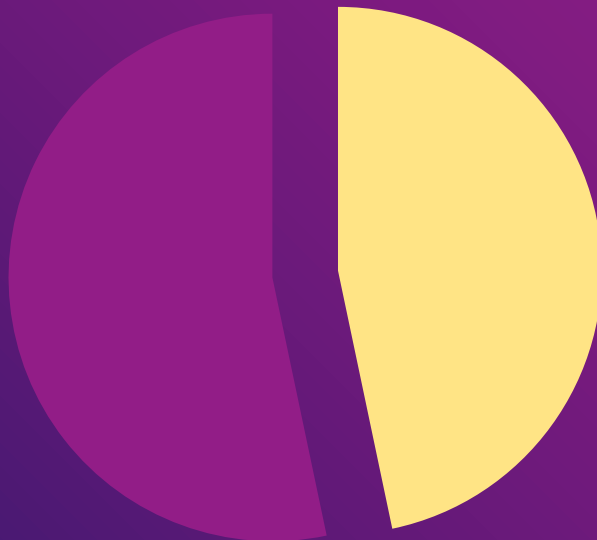


# GRADUATES FAMILY BACKGROUND



**53.3%**

of students with  
graduate parents  
manage to obtain a  
second level degree



**46.7%**

of students with parents  
with a university  
degree, on the other  
hand, manage to obtain  
a bachelor's degree

Source: ISTAT







# GRADUATES FAMILY BACKGROUND



41.3%

of students with non-graduate parents manage to obtain a second level degree



58.7%

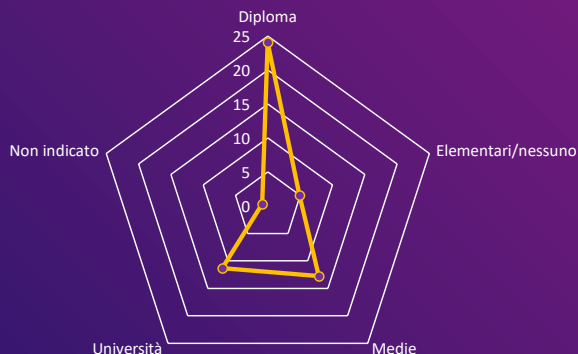
of students with parents without a university degree, on the other hand, manage to obtain a bachelor's degree

Source: ISTAT

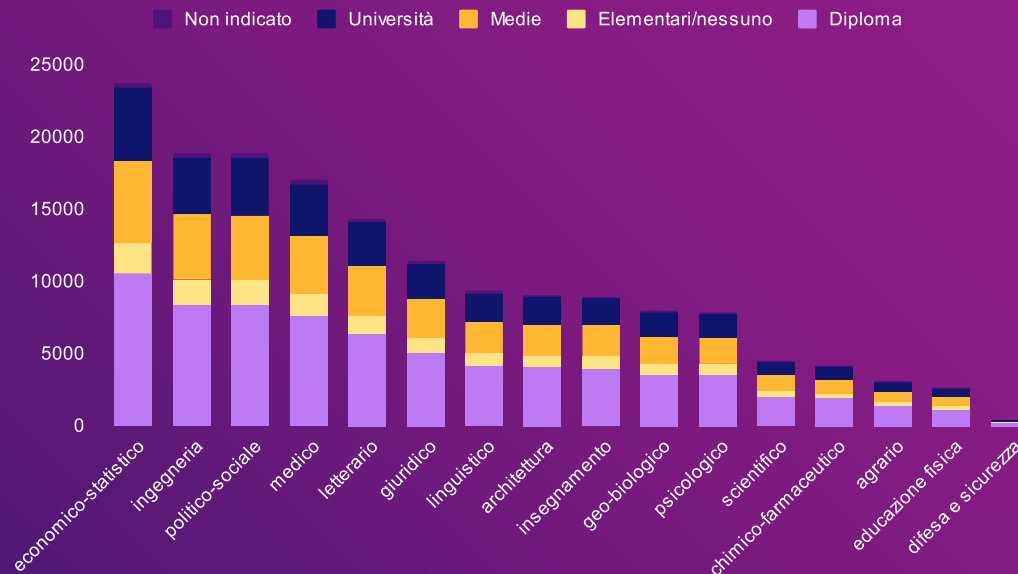




# GRADUATES FAMILY BACKGROUND



**24%** of graduate students have parents who have high school diploma,  
while students with graduate parents are only **11%**



Source: ISTAT





# GENDER JOB SEARCH



● ITALY ● ABROAD ● BOTH

Most males look for work both in Italy and abroad, while females look for work more in Italy. The figure of those who only look for work abroad is low.

Source: ISTAT





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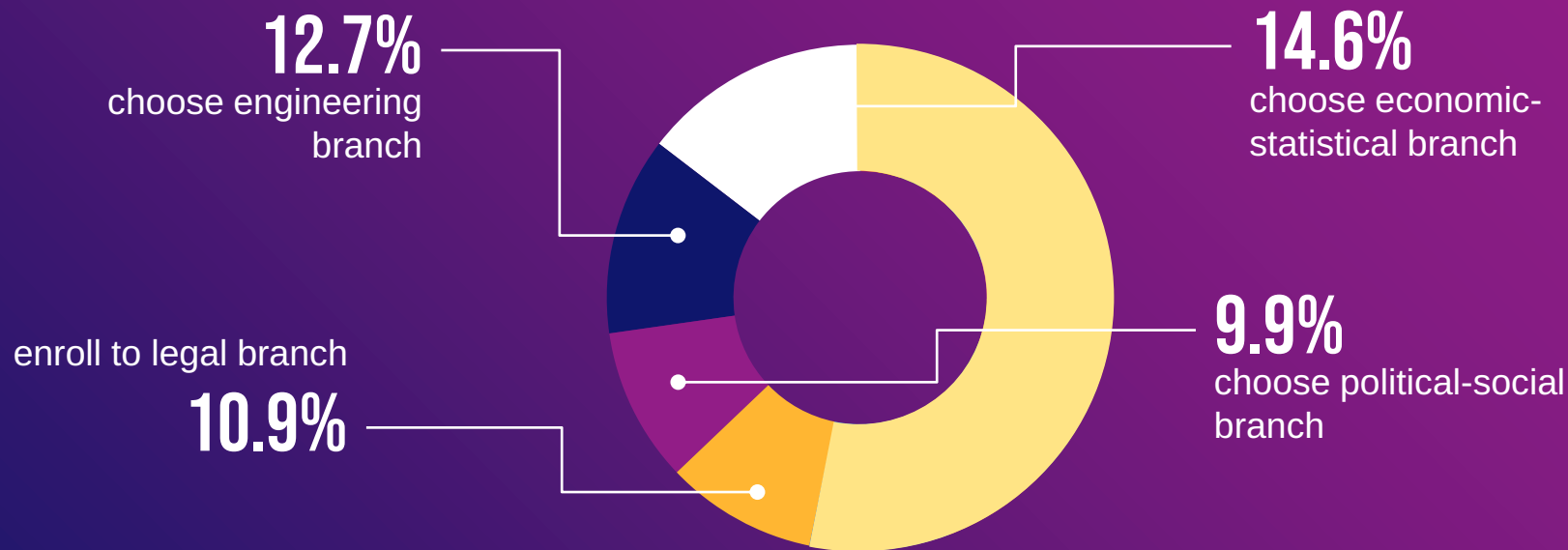
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# DIAGNOSTIC ANALYSIS



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# GROUP ENROLLMENT



Source: ISTAT





- ...but the total number of groups are **SIXTEEN** !

These four groups alone comprise almost

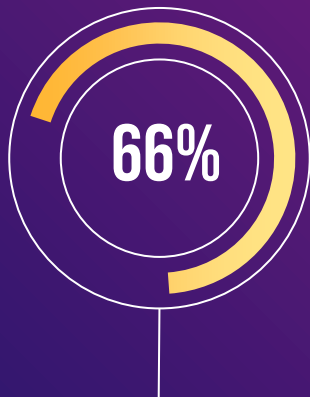
**50%**

of students enrolled since 2010.  
Why do they choose them?



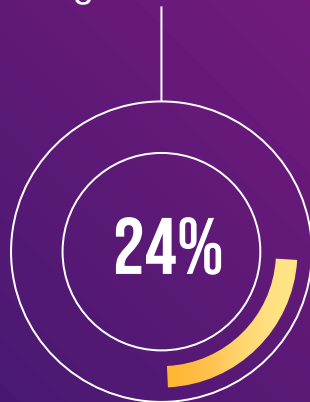


# BRANCH EMPLOYMENT



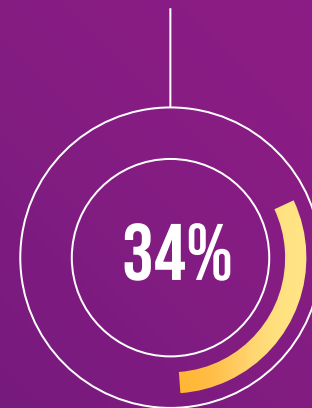
Enrolled in economics and statistics work immediately after graduation

Enrolled in the political-social field work before graduation



Legal students work before graduating

Engineers work or look for work after graduation



Source: ISTAT





# REGIONAL SCORES

In order to classify regions according to a score, it was decided to consider certain indicators such as

- number of library seats
- quality of Internet connection
- percentage of occupancy

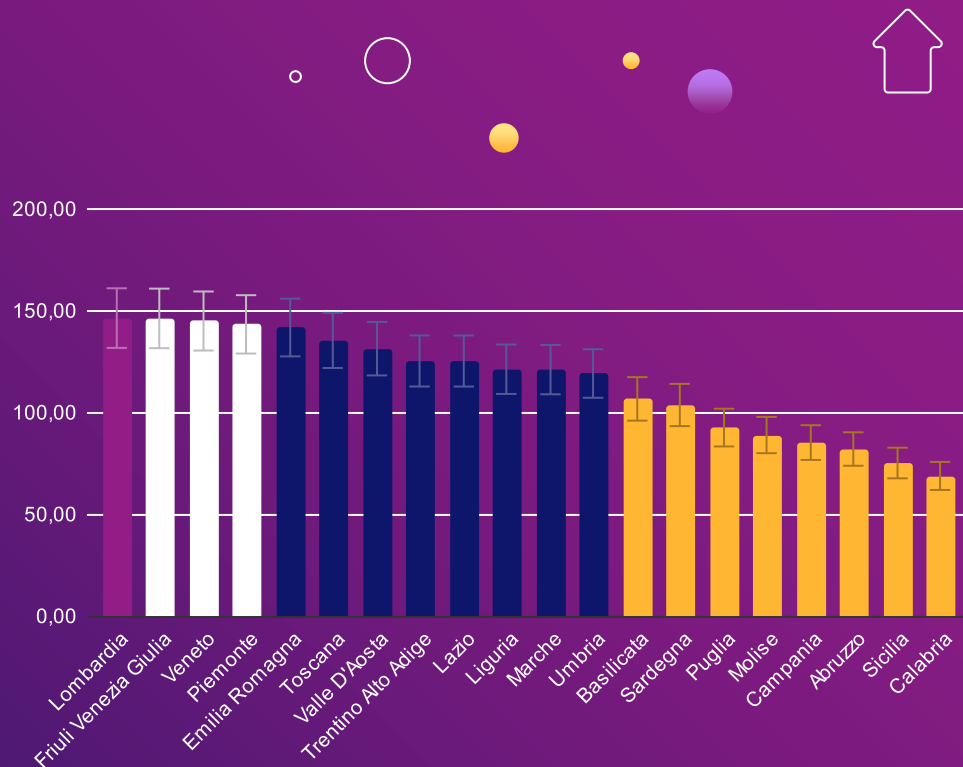
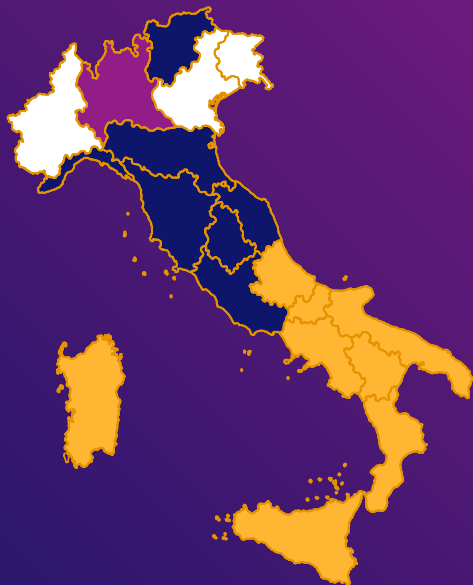
in finding the best region for a student





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# REGIONAL SCORES

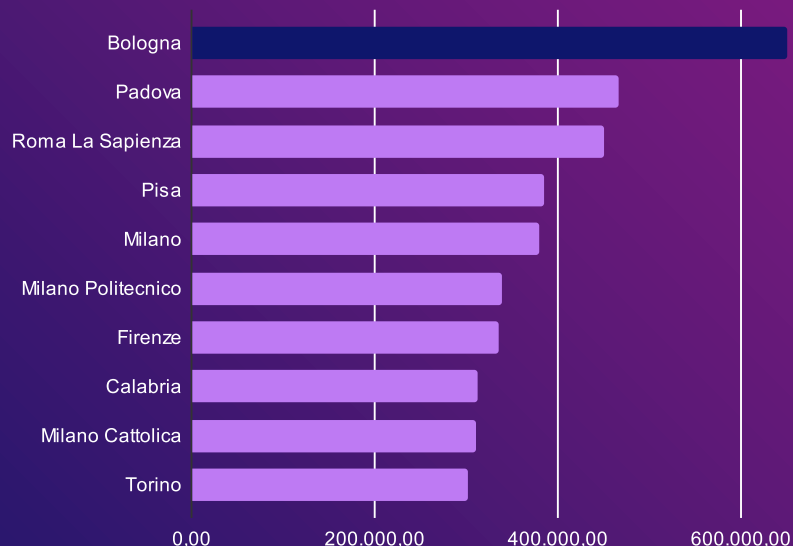


Source: ISTAT





# OUT-OF-TOWN STUDENTS



Out-of-town students choose more universities in high-scoring regions, and this is confirmed by the CENSIS ranking of the best Italian universities

 **BOLOGNA (91.5)**

 **PADOVA (88.5)**

 **FIRENZE (86.2)**

Source: ISTAT & CENSIS





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# PREDICTIVE ANALYSIS



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# FIRST YEAR FORECASTING



REAL VALUE

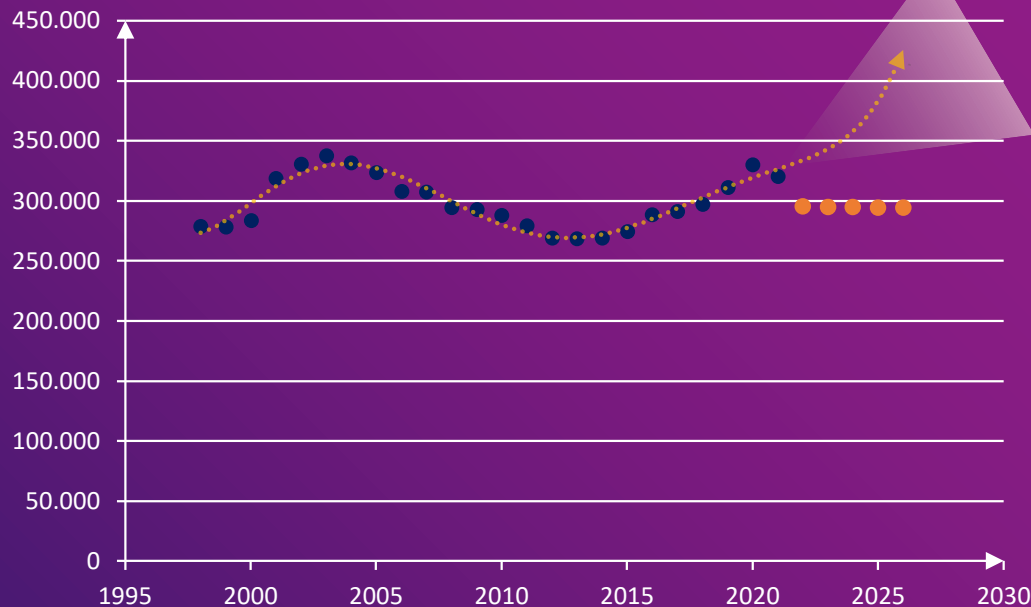


LINEAR PREDICTION



TREND ANALYSIS

Despite the slight decrease in the first few years, the trend over the last five years shows rapid growth

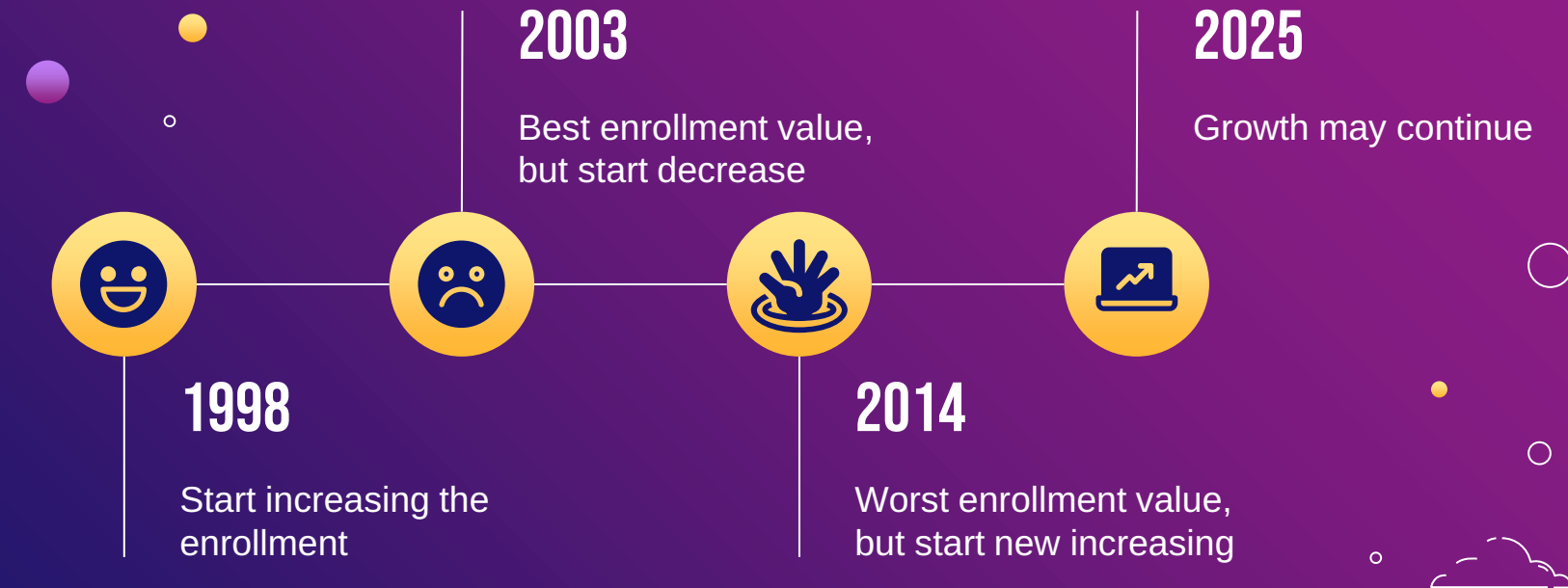


Source: MIUR



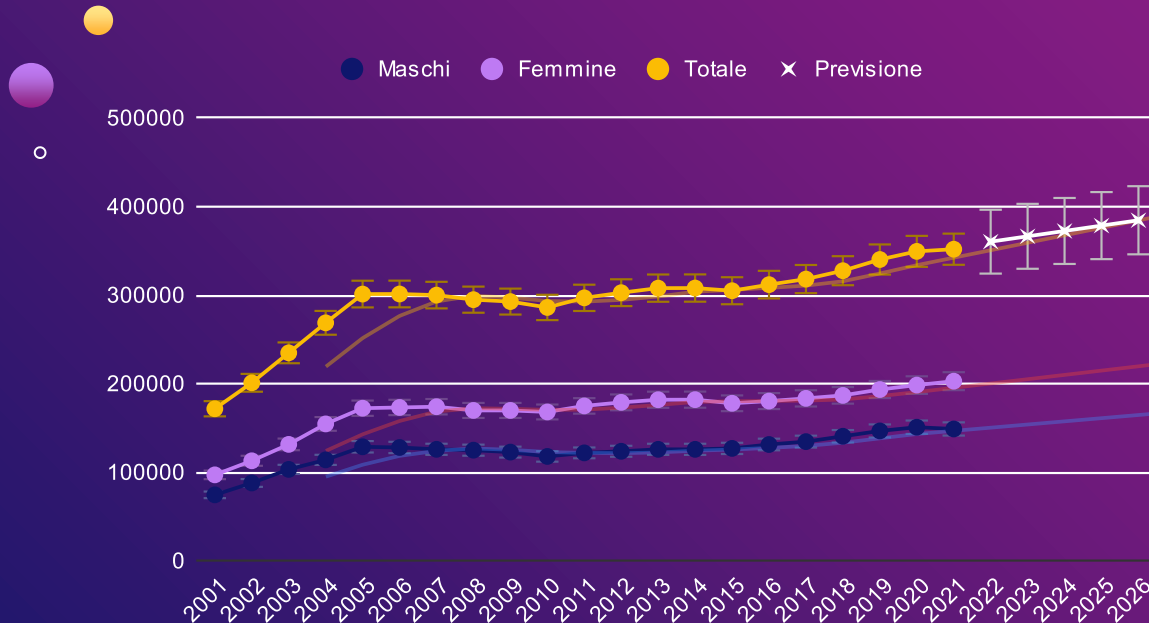


# ENROLLMENT EVOLUTION



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# GRADUATES PREDICTION



Source: MIUR

Forecast of  
graduates shows  
an upward trend  
**2025** until





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# PRESCRIPTIVE ANALYSIS



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« Di qualsiasi cosa i mass media si stanno occupando oggi, l'università se ne è occupata venti anni fa e quello di cui si occupa oggi l'università sarà riportato dai mass media tra vent'anni. »

—**UMBERTO ECO**





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# STUDENTS DECISIONAL PARAMS



UNIVERSITY PRESTIGE

3,05

QUALITY OF SERVICES

3

EDUCATIONAL OFFER

3,75

LOCATION PROXIMITY

3,35

EXPERIENCE

2,05

COST OF CHOICE

1,95

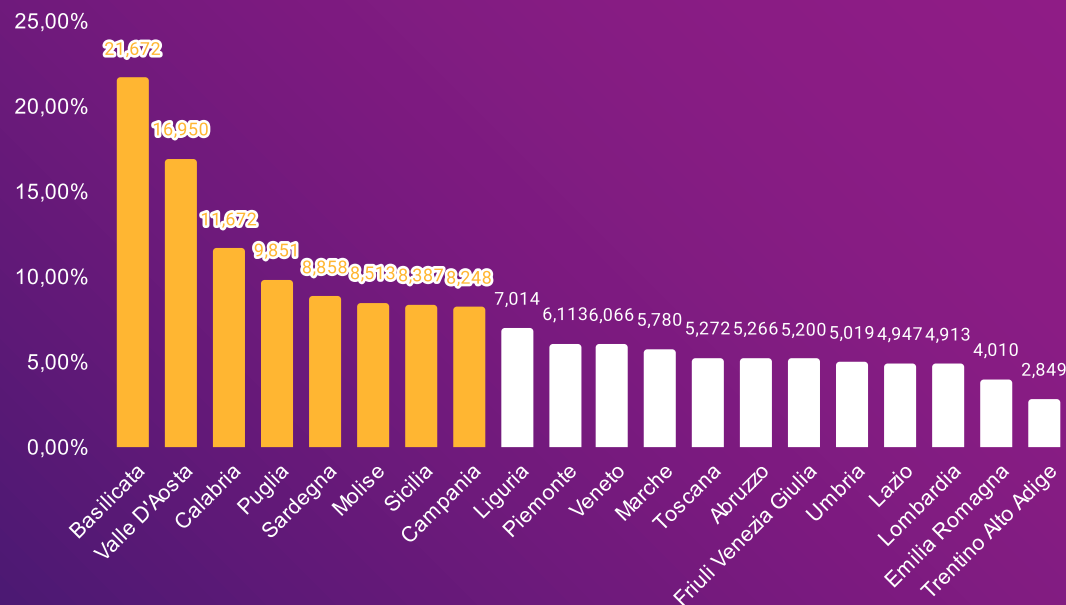
Source: ISTAT





# WHY INVEST IN THE SOUTH?

The southern regions have the highest percentage in Italy of graduates out of the number of students enrolled in the last 10 years. These regions churn out many students into the world of work and it is important not to waste any of them



Source: ISTAT





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SE VOGLIAMO **CHE TUTTO RESTI COM'È**  
**BISOGNA CHE TUTTO CAMBI**

*Il Gattopardo*





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# DATA

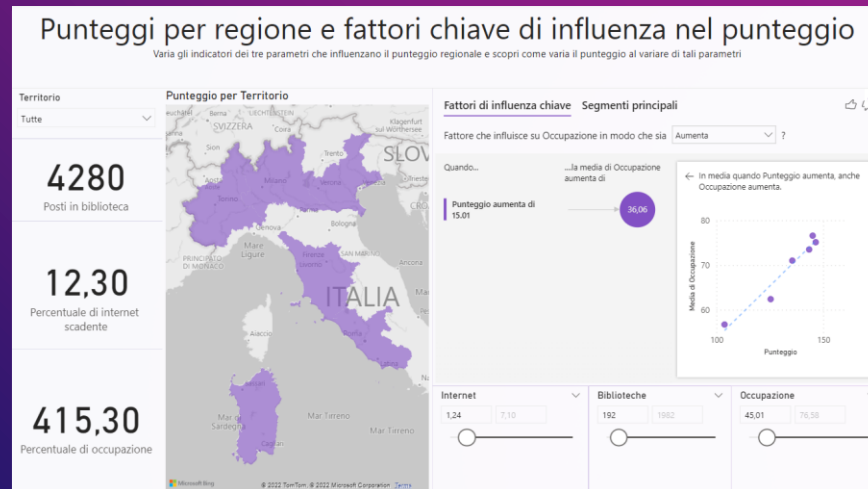
# VISUALIZATION



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# POWERBI DASHBOARD

In order to make the analysis more readable, it was decided to create dashboards using PowerBI



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# POWERBI DASHBOARD

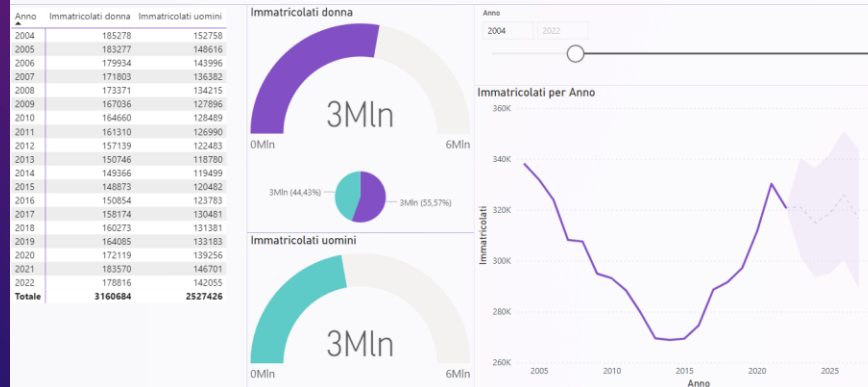


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# POWERBI DASHBOARD

## Previsione degli immatricolati per genere

Scegli un range temporale e verifica la disparità di genere tramite i relativi indicatori. Studia l'andamento della curva degli immatricolati nei prossimi 6 anni



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# POWERBI DASHBOARD





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# OUR TEAM



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## DO YOU HAVE ANY QUESTIONS?

