

**BiGGAR Economics**

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## Economic Contribution of University of Barcelona

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A report to  
**University of Barcelona**

September 2015

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Our thanks also go to those who helped organise the site visits and interviews given to members of our study team. The discussions that took place during these visits helped to inform the structure of our model and the format of our final report.

# 1 EXECUTIVE SUMMARY

BiGGAR Economics was asked by the League of European Research Universities (LERU) to assess the economic contribution of 20 member universities across Europe. While this work was being carried out, five member universities requested their own individual assessments. This report presents the findings for the University of Barcelona only.

The economic contribution was measured in terms of Gross Value Added (GVA)<sup>1</sup> to the economy and by the number of jobs supported by the organisation.

In 2014, the University of Barcelona generated a core economic contribution which is worth €419,5 million in GVA in Catalonia, €474,9 million GVA across Spain and €486,5 million GVA across Europe as a whole. Additionally, it supported 9.780 jobs in Catalonia, 11.870 jobs across Spain and 12.330 jobs across Europe. This contribution was generated through people employed directly at the University of Barcelona, through expenditure on supplies, money spent by staff in the local economy and spending on capital projects.

Student expenditure, student employment, student volunteering and student placements are worth a further €246,4 million in GVA to the economy of Catalonia and €284,1 million GVA throughout Spain and €333,4 million GVA across Europe as a whole. This supports a further 6.790 jobs in Catalonia, 7.870 jobs in Spain and 8.829 jobs in Europe.

We have considered seven key aspects of knowledge transfer, enterprise and innovation activity supported by the University of Barcelona that can reasonably be quantified in economic terms. These have a combined contribution which is worth €204,9 million in GVA and 5.119 jobs in Catalonia, €270,3 million in GVA and 6.590 jobs across Spain and €338,6 million in GVA and 8.250 jobs across Europe.

The tourism contribution created by visits to staff and students and attendance at conferences at the University of Barcelona creates a contribution of €5,6 million in GVA and 180 jobs in Catalonia, €6,6 million in GVA and 210 jobs in Spain and €8,1 million in GVA and 245 jobs across Europe.

One final contribution has been measured which is conceptually different from the others in that it occurs over a much longer period of time. The graduate premium recognises the increased earnings over a lifetime that stem from educating people to degree level. This contribution is estimated to be worth €522,2 million in GVA in Catalonia, €661,5 million in GVA across Spain and €682,4 million in GVA across Europe.

All contributions together suggest that the University of Barcelona generates a **total economic value of €1,4 billion in GVA and 21.870 jobs in Catalonia, €1,7 billion in GVA and 26.540 jobs across Spain and €1,8 billion in GVA and 29.650 jobs across Europe.**

The direct to total GVA multiplier is €5,92 and the direct to total employment multiplier 4,82. This implies that each €1 GVA directly generated by the University contributes €5,92 to the European economy and each direct employee of the University contributes 4,82 jobs in the wider European economy.

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<sup>1</sup> GVA is a measure of the economic value of goods and services produced in a given area. It is the total value of output less the value of intermediate inputs.

## 2 INTRODUCTION

This report summarises the findings of a study undertaken by BiGGAR Economics Limited into the economic contribution of the University of Barcelona in Catalonia.

### 2.1 Objectives

The objectives of the study were to quantify the economic value of the university in terms of:

- its core contribution to income and employment;
- the student-related contribution from students spending, working, volunteering and undertaking placements in the area;
- the knowledge transfer, enterprise and innovation activity created by and arising from the University of Barcelona;
- the tourism contribution created by visitors to staff and students and attendance at conferences and events held at the University; and
- life-time productivity gains from teaching and learning delivered by the University (graduate premium).

All of these contributions are assessed on a national level for Catalonia, a statal level for Spain and across Europe as a whole. The base year for all data is 2014, unless stated otherwise.

### 2.2 Background

This work was carried out as part of a wider appointment for the League of European Research Universities (LERU) to assess the economic value of its 21 members, located in 10 countries throughout Europe (Belgium, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland and the UK).

LERU is an association of research-intensive universities. It was founded in 2002 as a partnership among twelve multi-faculty research universities and expanded its membership to 21 in 2010. Its purpose is to influence research policy in Europe and to develop best practice through mutual exchange of experience. LERU regularly publishes a variety of papers and reports which make high-level policy statements, provide analyses and make recommendations for policymakers, universities, researchers and other stakeholders

The 21 members of LERU are: University of Amsterdam, University of Barcelona, University of Cambridge, University of Edinburgh, University of Freiburg, Université de Genève, Universität Heidelberg, University of Helsinki, Universiteit Leiden, KU Leuven, Imperial College London, University College London, Lund University, University of Milan, Ludwig-Maximilians-Universität München, University of Oxford, Pierre and Marie Curie University (Paris), Université Paris-Sud, University of Strasbourg, Utrecht University, University of Zurich.

## 2.3 The University of Barcelona

Founded in 1450, the University of Barcelona today comprises six campuses located within the inner city. The University has 18 faculties, in which 65 bachelor's degree programmes, almost 140 master's degree courses and 71 doctoral programmes are offered. With more than 55.500 full time and part time students and more than 6.100 teaching, research and administrative staff, it is the most renowned public institution of higher education in Catalonia. As well as this, the University of Barcelona has two campuses of International Excellence, the BKC and HUBc.

The University is the highest ranked university in Spain and is placed by the QS rankings:

- in the top 100 universities in the world for the faculties of Arts and Humanities (91<sup>st</sup>), Life Sciences and Medicine (92<sup>nd</sup>) and Natural Sciences (76<sup>th</sup>); and
- in the top 100 universities in the world for the subjects of Medicine, Pharmacy and Pharmacology, Chemistry, Earth and Marine Sciences and Environmental Sciences.

The University has 14 research institutes, 106 research departments and a research income of €58M. It has particular strengths in disciplines such as biomedicine and biotechnology, and is also active in other fields such as experimental sciences, social sciences, the humanities, and the fine arts.

The University of Barcelona was instrumental in creating the Barcelona Science Park (PCB), which was established in 1997 and was the first of its kind in Spain. The Science Park promotes innovation and knowledge transfer by leveraging relationships between the University, public research organisations and the private sector. At present it is home to 70 organisations and provides employment for approximately 2.000 people.

The University of Barcelona's Scientific and Technological Centres (CCiT) are equipped with state of the art research facilities occupying more than 12.000 sqm, offering the broadest range of instrumental technologies and highly qualified technical staff. The Centres further support research and innovation by providing researchers with advice on experimental techniques and organising technology training courses and seminars.

The Bosch i Gimpera Foundation (FBG) is the University of Barcelona's centre for the transfer of technology and innovation. The goal of the FBG is to bring the scientific skills and the research results generated at the University to market by means of contracts for R&D projects, consultancy services, the protection and licensing of Intellectual Property and the creation of knowledge-based companies (spin-outs).

## 2.4 Report Structure

This report is structured as follows:

- section three discusses the role of universities as drivers of productivity and economic growth, as well as the various ways in which universities impact the economy;

- section four presents the economic contribution arising from the University of Barcelona's core activities including those associated with direct income and employment, the purchase of bought in goods and services; staff spending and capital spending;
- section five describes the contributions associated with students whilst studying and spending in the local economy, volunteering and working on placements;
- section six describes the contribution of knowledge transfer, enterprise and innovation associated with the University of Barcelona and its employees using their knowledge to benefit other organisations, including the contributions from technology licensing, consultancy, contract and collaborative research, spin-outs and start-up companies, research and science parks, workforce training (CPD), Barcelona Science Park and staff volunteering;
- section seven assesses the University of Barcelona's contribution to tourism from visits to students and staff and from expenditure at conferences and events hosted by the University;
- section eight discusses the economic contribution arising from the increasing earnings generated during the working life of graduates as a result of having a university level education;
- section nine summarises the University of Barcelona's total economic contribution;
- section ten draws together the main conclusions of the report.

Appendix A provides a guide to abbreviations and terms commonly used throughout the report. The methodology used to calculate these contributions is described in detail in a separate Supplementary Methodological Appendix which accompanies this report.

## **2.5 Baseline Year, Measures and Geography**

The economic contributions described in this report are for 2014 which is the latest year for which published data on income, staff and students was available at the time of writing, in Spring 2015.

Economic contribution has been reported using two measures:

- Gross Value Added (GVA) is the measure of the value that an organisation, company or industry adds to the economy through their operations. The report used the production approach to measuring this contribution, where the GVA is equal to the value of production less the value of the inputs used. Typically this is calculated by subtracting the non-labour costs of the organisation from the organisation's total revenue.
- employment (jobs) is measured in terms of headcount jobs supported unless stated otherwise.

The contributions have been calculated on three geographic levels:

- Catalonia

- Spain; and
- Europe.

## 2.6 Number Formats

We appreciate that several of the countries covered by the LERU members use a different format for number presentation. This report has been produced using Spanish number formatting, i.e. the symbol for the thousands separator is a point on the line and the decimal marker is a comma on the line.<sup>2</sup>

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<sup>2</sup> 22<sup>nd</sup> General Conference on Weights and Measures, 2003.

### 3 UNIVERSITY DRIVEN GROWTH

Universities are recognised throughout the world as one of the critical drivers of economic growth. The growth of advanced economies has been associated with a growing role for universities, providing the intellectual and human capital required for a successful modern economy. This chapter examines the role of universities in underpinning growth by discussing how knowledge and innovation contribute to productivity growth and therefore economic growth and the various ways that universities impact the economy.

#### 3.1 Theoretical Foundations

As producers of highly-skilled graduates and postgraduates, generators of world-class research and development and located at the centre of industry clusters universities contribute to economic growth. In recent years a number of influential economists have published works that set out a theoretical and empirical case for the role that high level skills and innovation play in both boosting economic competitiveness and addressing inequality in society.

In the late 1950s Robert Solow published papers that showed that it was not the savings rate or increases in the factors of production (labour and capital) that determined the long-run growth rate, but increases in productivity. In the early 1960s Kenneth Arrow published papers on research and development and on learning by doing, which showed that almost all economic growth could be accounted for by innovation, both new ideas emerging from research and improving productivity through learning by doing during the process of production itself.

Building on this, the Nobel prize winning economist Joseph Stiglitz<sup>3</sup> has argued that productivity is the result of learning and consequently, a focal point of policy should be to increase learning within the economy. The observation is made that even within countries and within industries there can be big gaps between the most productive and the others. This means that the diffusion of knowledge is as important as pushing the boundaries of knowledge. Moreover, since productivity growth is what drives growth in the economy, this means there is considerable scope for higher rates of economic growth. As an illustration of this, of the productivity growth that took place in the UK between 2000 and 2008, nearly one third was attributable to changes in technology resulting from science and innovation.<sup>4</sup>

The scale of knowledge and innovation that takes place is also important because there are dynamic effects that come into play. New knowledge and innovation (the diffusion of knowledge) are both based on the foundations of prior knowledge and high levels of investment in knowledge and innovation give rise to an accelerating pace of innovation. In contrast, cutting levels investment in knowledge and innovation, will mean that the pace of innovation slows because underinvestment compounds over time.

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<sup>3</sup> Stiglitz and Greenwald (2014), *Creating a Learning Society: A New Approach to Growth, Development, and Social Progress*.

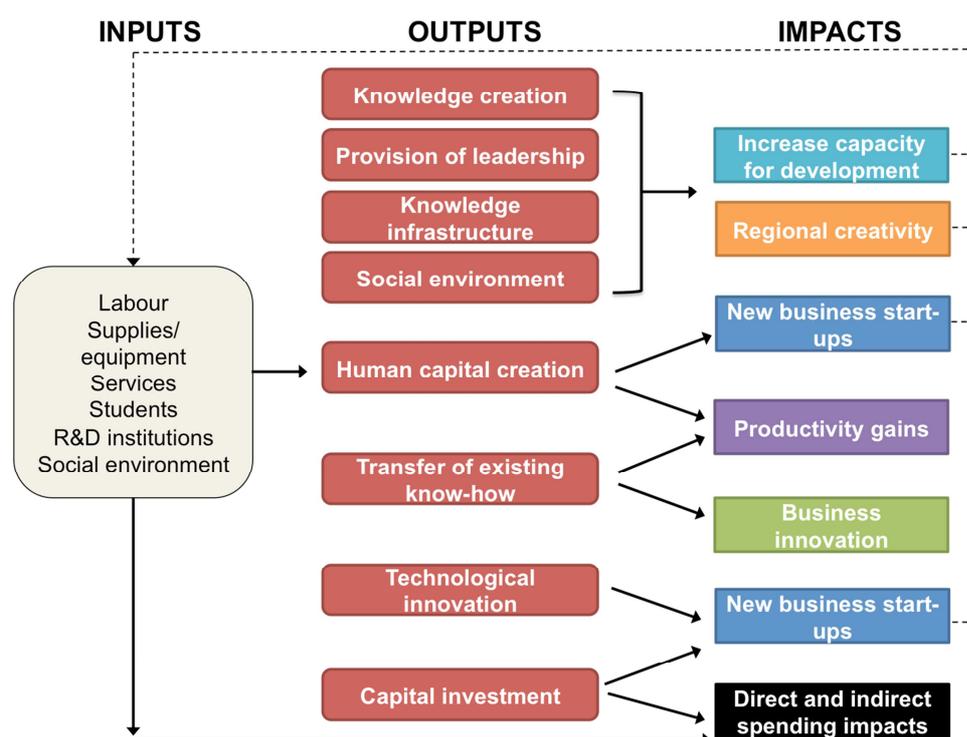
<sup>4</sup> HM Treasury, Department for Business, Innovation & Skills (December 2014), *Our Plan for Growth: Science and Innovation*.

In summary, knowledge and innovation are fundamental to economic growth, since it is productivity growth that drives economic growth and productivity growth is in turn driven by knowledge and its diffusion (innovation).

## 3.2 The Impact of Universities on the Economy

Universities have wide and far-reaching impacts on the economy, which are often interrelated. The outputs and direct and indirect positive economic impacts associated with the main activities that universities undertake are illustrated in Figure 3.1.

Figure 3.1: University Outputs and Expected Economic Impacts



Source: Goldstein and Renault (2004), *Contributions of Universities to Regional Economic Development: A Quasi-Experimental Approach*.

### 3.2.1 Knowledge and Human Capital Creation

The two fundamental activities of universities are the creation of intellectual and human capital. Universities contribute to knowledge creation through the basic and applied research that is undertaken. The most influential technologies today and the technologies of the future arise out of this research. Universities provide high quality graduates in the labour market which in turn increases the innovation potential of the economy, as well as leading to productivity gains for the economy.

### 3.2.2 Transfer of Existing Knowledge and Technological Innovation

Over and above these fundamental activities universities also work to transfer existing knowledge throughout the economy through their interactions with businesses such as through consultancy and workforce training, which increases productivity and business innovation. Universities are also a vital source of technological innovation through the commercialisation activities that they undertake such as spin-off companies and licensing of intellectual property.

### **3.2.3 Knowledge Infrastructure**

Universities also have a role to play in the production of knowledge infrastructures, which largely arise due to positive agglomeration effects. As an example, many research institutes, and companies choose to locate in close proximity to research intensive universities in order to benefit from informal knowledge sharing as well frequent face-to face contact with academics involved in research. It is for this reason that cities with universities also have large numbers of associated knowledge infrastructures such as research institutes and science parks, which can ultimately develop into knowledge clusters.

### **3.2.4 Provision of Leadership**

Many universities play an important leadership role regionally and nationally, through their involvement in the advisory boards of private, public and non-profit organisations. This ensures a coordinated economic development approach helping to match skills with regional needs and vice versa.

### **3.2.5 Social Environment – The University Ecosystem**

Finally universities can have a number of impacts on the local environment. The staff and student base provided by the universities undoubtedly contributes to the overall vibrancy of the cities they are located in.

In addition to adding to the quality of the local environment, universities contribute to the attractiveness of a region as a knowledge centre. This wider role of universities in underpinning the economy is something that should not be overlooked. Universities provide a space for discussion and create connections between academia, students and companies that would not otherwise exist and therefore foster an environment for innovation. This creates clusters of people, which lead to the creation of entire university ecosystems, which in turn draw more people.

The further impact of the university ecosystem is that it makes these regions the most attractive places to invest and are as a result vital to drawing inward investment. This is particularly important as the market for inward investment is globally competitive, a competitiveness that is increasing with the research and development being poured into Asia. The international dimension of the research undertaken at universities and the international character of the institutions themselves therefore contributes to improving Europe's brand as a whole, makes Europe more interlinked and provides opportunities for Europe to have partnerships with the wider world by attracting inward investment.

The university ecosystem is entirely built on the world-class research undertaken at universities. It is this world-class research that attracts companies and investment into a region and helps to catalyse innovation in local businesses. The fundamental research undertaken at universities therefore creates the knowledge sectors of the future. A Europe without this world-class research base would consequently be a Europe devoid of these knowledge industries.

## 4 CORE CONTRIBUTION

The core contribution covered in this chapter includes:

- the direct effect (income and employment);
- the supplier effect (contribution of expenditure on supplies and services and jobs supported by this spend);
- the income effect (contribution of staff spending); and
- the capital spending effect.

The Supplementary Methodological Appendix, a separate document which accompanies this report, gives a detailed explanation of the methods used to measure each aspect of economic contribution.

### 4.1 Direct Effect

The direct contribution of any organisation is the value it adds to the economy and the number of jobs it supports in a given time frame. The value an organisation adds to the economy is measured using gross value added (GVA), which can be estimated by subtracting all of the non-staff operating expenditure from the total operational income of the University.

The GVA and employment directly supported by the University of Barcelona is shown in Tables 4.1 to 4.3. These show that the University of Barcelona supports 6.148 full time equivalent jobs in the Spanish economy and has a contribution of €312,4 million. The further effects arising from this employment and economic output are estimated in the next section.

Table 4.1: The University of Barcelona – Inputs for Income

	Total (€M)
Teaching	113,0
Research	40,1
Other	219,1
Total Income	372,2

Source: *The University of Barcelona*

Table 4.2: The University of Barcelona – Inputs for GVA

	Total (€M)
Total Income	372,2
Less Expenditure on Supplies	59,8
Direct GVA	312,4

Source: *The University of Barcelona*

Table 4.3: The University of Barcelona – Inputs for Employment

	Total
University Employees (headcount)	7.542
University Employees (fte)	6.148

Source: *The University of Barcelona*

## 4.2 Spending on Supplies

The supplier effect is the contribution occurring from buying in goods and services since these purchases generate GVA and support employment in businesses that supply the University of Barcelona. The inputs used to calculate the supplier effect are shown in Table 4.4.

Table 4.4: The University of Barcelona – Inputs for Spending on Supplies

	Value	Source
Expenditure on Supplies	€59,8M	University of Barcelona
<b>Location of Suppliers</b>		
Catalonia	68%	University of Barcelona
Spain	30%	
Outside Spain	2%	

A further round of GVA and employment is supported indirectly by the businesses that supply goods and services to the University of Barcelona and this is calculated using multipliers for all industries as a whole.

The total supplier effect for the University of Barcelona is shown in Table 4.5. This shows that the university's spending on supplies supports 927 jobs in Catalonia and an economic contribution of €23,7 million, 1.592 jobs in Spain and an economic contribution of €40,2 million, with a contribution of €45,4 million and 1.889 jobs in Europe.

Table 4.5: The University of Barcelona – Contribution from Spending on Supplies

	GVA (€M)	Employment (jobs)
<b>Catalonia</b>		
Direct Contribution	11,0	385
Indirect Contribution	12,7	542
Total Supplier Contribution	23,7	927
<b>Spain</b>		
Direct Contribution	15,8	554
Indirect Contribution	24,4	1.038
Total Supplier Contribution	40,2	1.592
<b>Europe</b>		
Direct Contribution	16,1	562
Indirect Contribution	29,3	1.327
Total Supplier Contribution	45,4	1.889

Source: BiGGAR Economics Analysis

### 4.3 Staff Spending

The people employed directly by the University of Barcelona spend their wages and salaries in the wider economy and this also increases turnover and supports employment in local businesses and throughout Catalonia, Spain and Europe as a whole.

This effect can be estimated by assessing the amount of wages spent in each of the study areas, based on the number of employees and where they live. The key inputs used in calculating this contribution are shown in Table 4.6.

Table 4.6 – The University of Barcelona – Inputs for Staff Spending

Staff Numbers	Value	Source
Number of Employees (fte)	6.148	University of Barcelona
Staff Salaries	€231,1M	
Salaries as % of staff costs	87%	
<b>Staff Location</b>		
Catalonia	99%	University of Barcelona
Spain	100%	
Europe	100%	
<b>Location of Spending</b>		
Catalonia	75%	BiGGAR Economics Assumption
Spain	95%	
Europe	99%	

These expenditure figures can then be converted into a GVA contribution by applying an appropriate turnover/GVA ratio, which has the effect of excluding

taxation paid by employees from the contribution estimates. The income effect estimated here is therefore a conservative estimate since it excludes the contribution of employees to the provision of public services paid for from Government taxation receipts.

The resulting employment contributions are calculated by dividing the GVA contribution by an estimate of the average GVA/employee and finally multipliers are applied to capture the indirect effects of subsequent spending rounds (details are provided in the Supplementary Methodological Appendix).

This results in a staff spending contribution of €76,9 million GVA and 2.561 jobs in Catalonia, €112,3 million GVA and 3.906 jobs in Spain, €118,7 million GVA and 4.074 jobs in Europe as a whole. This is summarised in Table 4.7.

Table 4.7: The University of Barcelona – Contribution from Staff Spending

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	44,4	1.091
Indirect Contribution	32,6	1.470
Total Staff Spending Contribution	76,9	2.561
<b>Spain</b>		
Direct Contribution	56,8	1.397
Indirect Contribution	55,6	2.509
Total Staff Spending Contribution	112,3	3.906
<b>Europe</b>		
Direct Contribution	59,0	1.446
Indirect Contribution	59,6	2.628
Total Staff Spending Contribution	118,7	4.074

Source: BiGGAR Economics Analysis

## 4.4 Capital Spending Contribution

Over the ten year period from 2009 to 2019, average annual spending on capital projects by the University of Barcelona is anticipated to be €7,0 million per year. As the nature of the capital projects will vary from year to year, this average annual expenditure figure is used to reflect the fact that the University is likely to periodically invest in major capital development projects over the longer term.

Capital spending provides an important income stream for the regional construction sector and it is possible to convert this expenditure into GVA by applying a turnover to GVA ratio for the construction sector. The employment contribution of this expenditure is estimated by dividing the GVA contribution by an estimate of average GVA per employee in the construction sector.

The indirect contributions of this expenditure can then be calculated by applying GVA and employment multipliers for the construction sector. In this way it can be estimated that the total contribution of construction expenditure by the University of Barcelona amounts to €10,0 million in GVA in Europe as a whole, of which

approximately €6,4 million occurs in Catalonia. This results in an overall employment contribution of 220 jobs, of which 144 are supported in Catalonia.

The inputs used in calculating this contribution are summarised in Table 4.8 and the results are summarised in Table 4.9.

Table 4.8: The University of Barcelona – Inputs for Capital Spending

Capital Spending	Value	Source
Total Capital Expenditure 2009-2013	€47,0M	University of Barcelona
Estimated Capital Expenditure 2014-2019	€30,0M	University of Barcelona estimate
Average Annual Capital Expenditure, 2009-2019	€7,0M	
Location of Spending		
Catalonia	80%	BiGGAR Economics Assumption
Spain	100%	
Europe	100%	

Table 4.9: The University of Barcelona – Contribution from Capital Spending

	GVA (€M)	Employment
Catalonia		
Direct Contribution	1,8	47
Indirect Contribution	4,6	96
<b>Total Capital Spending Contribution</b>	<b>6,4</b>	<b>144</b>
Spain		
Direct Contribution	2,2	59
Indirect Contribution	7,7	161
<b>Total Capital Spending Contribution</b>	<b>10,0</b>	<b>220</b>
Europe		
Direct Contribution	2,2	59
Indirect Contribution	7,7	161
<b>Total Capital Spending Contribution</b>	<b>10,0</b>	<b>220</b>

Source: BiGGAR Economics Analysis

The figures summarised above quantify the value that capital expenditure undertaken by the University of Barcelona generates for the Catalonian economy each year, however what cannot be quantified is the wider effect of this expenditure on the city of Barcelona.

The scale of the University and the capital investment projects it undertakes means that it can have a transformational effect on the neighbourhoods in which it operates. By coordinating investment with other large institutions and public agencies, the University has become an important driver of economic regeneration for the city. Nowhere is this more evident than in the municipal

districts with lower socioeconomic level: the historic district of El Raval and the district with higher unemployment Nou Barris (Torre Baró).

El Raval is located in the medieval city quarter of Barcelona. Until recently it was one of the most densely populated urban areas in the world and one of the most deprived parts of Barcelona.

Concerted efforts to regenerate El Raval began in the late 1980s. One of the most significant changes to have occurred in the area since that time is the development of a major cultural complex, focused around the Museu d'Art Contemporani and the Centre de Cultura Contemporània de Barcelona (CCCB). The complex has played a key role in driving the regeneration of the El Raval neighbourhood by providing the focus for a new cultural circuit in the city.

The University of Barcelona made a major contribution to developing the cultural complex when it relocated its faculties of History, Geography and Philosophy to the area in 2006. Located less than 200 meters from the CCCB, the new campus now accommodates around 4,500 students and over 400 staff, all of whom help to make the area more vibrant by spending money in local businesses and socialising in the area. While the economic impact of this student spending is quantified elsewhere in this report, the wider contribution that it has made to the regeneration of El Raval and more importantly, the quality of life of the people living there, is impossible to quantify.

## **4.5 Summary of Core Contributions**

The contributions associated with the core activity of receiving income, supporting employment, spending on goods and services and capital projects results in an estimated contribution of €419,5 million in GVA and 9.780 jobs in Catalonia, €474,9 million in GVA and 11.866 jobs in Spain, €486,5 million in GVA and 12.331 jobs in Europe as a whole. These figures include the multiplier effects of the core activity.

The core contributions are summarised in Table 4.10.

Table 4.10: The University of Barcelona – Core Contribution Summary

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	312,4	6.148
Supplier Contribution	23,7	927
Staff Spending Contribution	76,9	2.561
Capital Spend Contribution	6,4	144
<b>Total Core Contribution</b>	<b>419,5</b>	<b>9.780</b>
<b>Spain</b>		
Direct Contribution	312,4	6.148
Supplier Contribution	40,2	1.592
Staff Spending Contribution	112,3	3.906
Capital Spend Contribution	10,0	220
<b>Total Core Contribution</b>	<b>474,9</b>	<b>11.866</b>
<b>Europe</b>		
Direct Contribution	312,4	6.148
Supplier Contribution	45,4	1.889
Staff Spending Contribution	118,7	4.074
Capital Spend Contribution	10,0	220
<b>Total Core Contribution</b>	<b>486,5</b>	<b>12.331</b>

Source: BiGGAR Economics Analysis

## 5 STUDENT CONTRIBUTION

The contributions covered in this chapter are those associated with students whilst studying, including:

- student spending;
- students working part-time;
- student volunteering; and
- student placements.

### 5.1 Student Population

In 2014 the University of Barcelona had a student population of 55,514 full time and part time students, of which 82% were undergraduates and the remaining were postgraduate students. Around 12% of the University's full time students studying on campus are international students representing 126 nationalities.

The total student population includes both full time and part time students. The impact associated with students varies according to how much time they spend at university so before estimating these impacts it was first of all necessary to convert the total number of students into a full time equivalent number of students. This was done based on the definition of a full-time course of study as one that attracts 60 ECTS credits in an academic year. Using this definition it was estimated that 47,570 full time equivalent (FTE) students were studying at the University of Barcelona in 2014.

Table 5.1 provides a breakdown of the University of Barcelona's student population.

Table 5.1: The University of Barcelona – Student Population

	Full Time Equivalent	Total
Undergraduate	39.077	45.336
Taught Postgraduate	3.106	4.791
Research Postgraduate	5.387	5.387
<b>Total</b>	<b>47.570</b>	<b>55.514</b>

Source: University of Barcelona

### 5.2 Student Spending

Students create an economic contribution through spending their income in local businesses. In turn these businesses are able to employ more people which creates further multiplier effects in the local economy.

The basis for calculating the student spending impact is a study undertaken by the UK Government<sup>5</sup> that considered the level of expenditure of students in the UK. This report considered the expenditure of students on different commodities, including accommodation, entertainment and food costs.

<sup>5</sup> Department of Business, Innovation and Skills, *Student Income & Expenditure Survey 2011/12, 2012*

As the costs of living vary from city to city, the expenditure of students is also likely to vary. In order to reflect this, the expenditure per commodity for London, as given in the UK Government report, was adjusted to reflect the comparative cost of living for Barcelona. This was calculated using the Consumer Price Index (CPI) and Rent Index (RI) for Barcelona. This provided an expenditure profile for the city of Barcelona which was applied to the number of students at the University.

This estimates that, on average, students will require €831 per month to cover housing, living and social costs while studying. The key inputs used in making these calculations are shown in Table 5.2. It should be noted that the expenditure figures in this table do not include expenditure by students on tuition fees. This is because tuition fees are part of the University of Barcelona's income and are therefore included within the direct impact of the University in section 4.1.

Table 5.2: The University of Barcelona – Inputs for Student Spending

	Value	Source
Total number of FTE students	47.570	University of Barcelona
<b>Monthly Student Expenditure Profile (€)</b>		
Accommodation	275	BiGGAR Economics calculation based on Department of Business, Innovation and Skills, <i>Student Income &amp; Expenditure Survey 2011/12</i> and CPI and Rent Indices
Travel	143	
Food/Household Expenses	159	
Entertainment	66	
Course Costs (e.g. books, equipment)	40	
Other	147	
<b>Total Monthly Expenditure</b>	<b>831</b>	
<b>Term-time Residence</b>		
Catalonia	100%	BiGGAR Economics Assumption
Spain	100%	
Europe	100%	
<b>Time on Campus</b>		
Undergraduates (months per year)	9	BiGGAR Economics Assumption
Postgraduates (months per year)	12	

We then calculate how much GVA this level of expenditure provides and how many jobs it supports across the relevant sectors of the economy using national level input-output ratios for each sector. The Supplementary Methodological Appendix provides a more detailed description of the methodology used. These ratios vary for each sector depending on the relative amount of capital and labour involved in generating output from each one.

A further round of GVA and employment is then supported indirectly through this level of spending (the indirect effect) and this is estimated by applying sector-specific multipliers to the direct contribution. Finally, these figures are added together to estimate the total contribution of student spending. The results are shown in Table 5.3.

This results in a student spending contribution of €173,2 million GVA and 4.650 jobs in Catalonia, €204,40 million GVA and 5.525 jobs in Spain and €243,2 million GVA and 6.153 jobs in Europe as a whole.

Table 5.3: The University of Barcelona – Contribution from Student Spending

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	79,9	2.028
Indirect Contribution	93,4	2.623
<b>Total Student Spending Contribution</b>	<b>173,2</b>	<b>4.650</b>
<b>Spain</b>		
Direct Contribution	79,9	2.028
Indirect Contribution	124,5	3.497
<b>Total Student Spending Contribution</b>	<b>204,4</b>	<b>5.525</b>
<b>Europe</b>		
Direct Contribution	79,9	2.028
Indirect Contribution	163,3	4.125
<b>Total Student Spending Contribution</b>	<b>243,2</b>	<b>6.153</b>

Source: BiGGAR Economics Analysis

### 5.3 Part-time Work

Students working part-time can make an important contribution to the local labour market by helping local businesses and organisations to deliver their goods and services. An annual student survey undertaken by the University of Barcelona (with a 20% response rate), indicates that 41% of undergraduate students and 49% of postgraduate masters students work part-time.

It is reasonable to assume that some of these jobs may otherwise have been filled by non-students. In order to reflect this we have taken account of local labour market conditions by using the youth unemployment rate in Barcelona as an indicator of the availability of replacement labour. The additionality of student labour is therefore assumed to be inversely proportional to the youth unemployment rate. Barcelona has a youth unemployment rate of 54% and based on this the additionality of student labour has been calculated to be 10%. (See Supplementary Methodological Appendix for a full explanation of how this has been calculated.)

The economic activity supported by the 883 students who work for the University has been captured in the direct contribution analysis in the previous chapter, therefore these jobs have been excluded from this section of the analysis to avoid double counting. The key inputs used in calculating the contribution of student part-time work are shown in Table 5.4.

Table 5.4: The University of Barcelona – Inputs for Student Part-time Working

	Value	Source
Number of students (FTEs)	47.570	University of Barcelona
Proportion of undergraduate students who undertake part-time work	41%	
Proportion of postgraduate students who undertake part-time work	49%	
Number of students who undertake part-time work for the University	883	
Average hours worked per week	14	BiGGAR Economics Assumption
Number of hours worked per week in FTE equivalent job	30	
Additionality of part-time labour	10%	BiGGAR Economics calculation based on youth unemployment rates

The value of the additional economic activity (GVA) supported by student employment is estimated by applying national ratios of GVA/ employee for the sectors in which students typically work. A further round of GVA and employment is then supported indirectly through this level of spending (the indirect effect) and this is estimated by applying sector-specific multipliers to the direct contribution.

This results in a total contribution from student employment of €17,7 million GVA and 758 jobs in Catalonia, €19,3 million GVA and 832 jobs in Spain and €21,7 million GVA and 965 jobs in Europe as a whole (Table 5.5).

Table 5.5: The University of Barcelona – Contribution from Student Part-time Working

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	13,0	534
Indirect Contribution	4,8	223
<b>Total Part-time Working Contribution</b>	<b>17,7</b>	<b>758</b>
<b>Spain</b>		
Direct Contribution	13,0	534
Indirect Contribution	6,4	298
<b>Total Part-time Working Contribution</b>	<b>19,3</b>	<b>832</b>
<b>Europe</b>		
Direct Contribution	13,0	534
Indirect Contribution	8,7	430
<b>Total Part-time Working Contribution</b>	<b>21,7</b>	<b>965</b>

Source: BiGGAR Economics Analysis

## 5.4 Student Volunteering

In 2014, 1,974 students and members of staff from the University of Barcelona participated in some kind of voluntary activity. Much of this activity was coordinated through Voluntariat UB, a public initiative that fosters involvement in social responsibility initiatives among members of the University community and external volunteers. Over the years Voluntariat UB has channelled institutional contributions to several charitable projects ranging from collections of medicine, food, toys, and clothes for the Red Cross to collections for local food banks and support for the activities of the Arrels Foundation, a Barcelona based homeless charity. Voluntariat UB also organises its own charitable activities. For example a team from the University took part in the Trailwalker race (a 100 km challenge to organised by Oxfam) and another group organised a fund-raising yoga course.

The University of Barcelona also makes an important contribution to charitable causes around the world through the UB Solidarity Foundation. The Foundation was founded in 1996 with the aim of supporting initiatives that defend human rights and promote social action. It does this by providing advice and assessment services, conducting its own projects, and contributing to projects run by other institutions and organisations. Notable examples during the 2014/15 academic year included:

- a water management project in Vietnam;
- an initiative to improve governance and public engagement in Morocco;
- rural development and peace-building in Colombia;
- the launch of joint postgraduate programmes with partner universities in Senegal and Mauritania;
- working with the Barcelona Training and Employment Foundation to collect used clothes for vocational workshops with at-risk individuals; and

- launching a public garden project in several neighbourhoods in the Barcelona metropolitan area.

Although all of this activity was unpaid, it still has a value for society, which adds to the overall economic contribution of the University. Part of the value of this student volunteering can be captured quantitatively by estimating the number of student hours that were contributed towards volunteering.

These inputs are shown in Table 5.6. The value of these hours to the organisations is estimated by multiplying the total number of hours volunteered by the wage that would be normally paid to a student.

Table 5.6: University of Barcelona – Inputs for Student Volunteering

	Value	Source
Number of students volunteering	1.974	University of Barcelona
Average hours volunteered	55	BiGGAR Economics Assumption

These inputs result in an estimate of the value of student volunteering of at least €0,6 million across Europe. The nature of this type of activity is that it will contribute to increasing the productivity of the organisation volunteered for (by contributing to service provision) and will therefore be a GVA impact rather than an employment impact.

Table 5.7: University of Barcelona – Contribution from Student Volunteering

	GVA (€M)
Catalonia	0,6
Spain	0,6
Europe	0,6

Source: BiGGAR Economics Analysis

However, in practice the value of student volunteering will be greater than this figure suggests as the calculations are only a crude method which captures the value of the students' time. It does not reflect the wider community benefits:

- the value of the volunteering to the service supported as many organisations could not run without the existence of these additional volunteers;
- the value of the services to the people who use them; and
- the value of the impacts on service users, as improvements in health and wellbeing will result in cost savings in health and social services.

## 5.5 Student Placements

A number of degree programmes require students to undertake work placements that have an impact on the economy through the students' contribution to the organisations they are placed with. Only placements that are longer than 12 weeks have been considered, as shorter placements would not allow students enough time to learn about the organisation's activity sufficiently well to make an effective contribution.

The contribution of these students to the organisations they are placed in is lower than the average output that would be expected by a worker due to a student having less experience and being less productive. To reflect this it is assumed that the GVA of students on placement is 50% of the average workers' GVA. The impact of these placements has been estimated by applying this percentage to the weekly GVA per employee and then to the number of weeks that the placements last.

Table 5.8: The University Of Barcelona – Inputs for Student Placements

	Value	Source
Number of students on placement (medical)	5.776	University of Barcelona
Number of students on placement (non-medical)	2.819	
Length of placement (weeks)	12	
Productivity as proportion of sector worker	50%	BiGGAR Economics Assumption

Applying appropriate economic ratios and multipliers as explained in the Supplementary Methodological Appendix, this results in a total contribution from student placements of €54,8 million GVA and 1.385 jobs in Catalonia, €59,8 million GVA and 1.516 jobs in Spain and €67,9 million GVA and 1.712 jobs in Europe (Table 5.9).

Table 5.9: The University of Barcelona – Contribution from Student Placements

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	39,8	992
Indirect Contribution	15,0	393
Total Placements Contribution	54,8	1.385
<b>Spain</b>		
Direct Contribution	39,8	992
Indirect Contribution	20,1	524
Total Placements Contribution	59,8	1.516
<b>Europe</b>		
Direct Contribution	39,8	992
Indirect Contribution	28,1	720
Total Placements Contribution	67,9	1.712

Source: BiGGAR Economics Analysis

## 5.6 Summary of Student Contributions

The economic value associated with student spending and student employment is estimated at €246,4 million in GVA and 6.794 jobs in Catalonia, €284,1 million and 7.873 jobs in Spain and €333,4 million in GVA and 8.829 jobs in Europe (Table 5.10).

Table 5.10: The University of Barcelona – Economic Contribution from Student Activities

	GVA (€M)	Employment
<b>Catalonia</b>		
Student Spending Contribution	173,2	4.650
Student Working Contribution	17,7	758
Student Volunteering Contribution	0,6	-
Student Placements Contribution	54,8	1.385
<b>Total Student Contribution</b>	<b>246,4</b>	<b>6.794</b>
<b>Spain</b>		
Student Spending Contribution	204,4	5.525
Student Working Contribution	19,3	832
Student Volunteering Contribution	0,6	-
Student Placements Contribution	59,8	1.516
<b>Total Student Contribution</b>	<b>284,1</b>	<b>7.873</b>
<b>Europe</b>		
Student Spending Contribution	243,2	6.153
Student Working Contribution	21,7	965
Student Volunteering Contribution	0,6	-
Student Placements Contribution	67,9	1.712
<b>Total Student Contribution</b>	<b>333,4</b>	<b>8.829</b>

Source: BiGGAR Economics Analysis

## 6 KNOWLEDGE TRANSFER, ENTERPRISE AND INNOVATION

This section considers the contribution of knowledge transfer, enterprise and innovation occurring in the economy due to the University of Barcelona's activity. This is often referred to as commercialisation or valorisation activity. It relates to the concept of capitalising on the research, technology and skills within the work of the University of Barcelona and transferring the benefits more widely through the creation of new businesses and opportunities outside the organisation<sup>6</sup>.

Specifically, we have considered the contribution of seven key aspects of knowledge transfer, enterprise and innovation that can reasonably be quantified:

- contract and collaborative research;
- consultancy;
- start-up and spin-out companies; the Barcelona Science Park; licensing;
- workforce training (CPD); and
- staff volunteering.

### 6.1 Knowledge Transfer at the University of Barcelona

Responsibility for promoting knowledge transfer at the University of Barcelona is divided between various different entities within the University of Barcelona Group.

- **The Bosch i Gimpera Foundation** exists to bring the scientific and technical skills and the results of the research generated at the University of Barcelona to the market by means of research and development contracts, consultancy services, licencing agreements and the creation of new knowledge-based enterprises. The Foundation is responsible for monitoring the companies in which it has a stake and also provides administrative, accounting, tax and legal support to help these companies develop.
- **Innovative and Scientific Culture (CIC-UB)** was established in 2003 as a sole proprietorship within the University of Barcelona Group. The role of the entity is to hold, manage, administer and make calls on shares in potential spin-off companies and other technological and scientific initiatives within the Group.
- **The Patents Centre** is a research centre within the University of Barcelona that was established in 1987. It undertakes research, teaching and outreach work in the field of industrial property and documentation. It is also responsible for patent protection at the University.
- **The Scientific and Technological Centres (CCiT-UB)** are a group of facilities designed to provide coordinated, integral support for research activities at the University of Barcelona. Services are offered to the entire university community and to public institutions and private firms involved in

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<sup>6</sup> See Section 3 for further discussion on how universities create economic impact through knowledge transfer.

research and transfer agreements with the University.

- **The Barcelona Science Park Foundation** was constituted by the University of Barcelona in 1997. It is responsible for managing the University owned Barcelona Science Park.

Although some of these entities are legally separate from the University of Barcelona they were all created to support the transfer of knowledge developed within the University (and its partners) so it is appropriate to consider the impact of their activity here.

## 6.2 Contract and Collaborative Research

The University of Barcelona is Spain's leading research university. According to the European Commission's Third European Report on Science and Technology Indicators it publishes more research than any other Spanish institution with the exception of the Spanish National Research Council (CSIC).

The work of the research groups is overseen by the University of Barcelona's research centres and institutes, which collaborate with leading research institutions and networks in Spain and overseas. The University of Barcelona is also home to three large research foundations: the Barcelona Science Park (PCB), which houses the Institute of Biomedical Research (IRB) and the Institute for Bioengineering of Catalonia (IBEC); the August Pi i Sunyer Biomedical Research Institute (IDIBAPS); and the Bellvitge Institute for Biomedical Research (IDIBELL).

The health related research activity developed by the University of Barcelona has also an outstanding relevance through research centres such as the Barcelona Institute for Global Health (ISGlobal), in which the University participates, and through initiatives such as the Hospitals of Dentistry and Podiatry and the Clinics of Psychology of the University of Barcelona which are managed by the Foundation Finestres. It has also to be mentioned the University of Barcelona participation as member and holding the vice-presidency of the new Consortium of the Hospital Clinic of Barcelona.

The benefits of this research activity are not restricted to activity directly undertaken by academic researchers but also include the benefits of collaborative research and consultancy ventures with partners both nationally and internationally. Encouraging this type of collaborative activity is an important priority for the University – indeed one of the core aims of the Barcelona Science Park (see Section 6.5) is to create an environment that is conducive to opportunities for academic/industrial collaboration. Although the extent of this effect is difficult to quantify, collaborative research is of such importance to the Spanish economy that it is essential that this contribution be considered.

An important feature of academic research is that it does not typically represent the final stage of technology development process i.e. in general it tends to be focused at an intermediate stage in the technology development cycle and is unlikely to lead to immediate full scale commercial production or application.

In order for the full results of such research to be realised, it is normally necessary for industrial partners to undertake further development work. The amount of subsequent research investment required will depend on the readiness level of the technology concerned and is likely to vary significantly between projects and could amount to many times the original investment.

It is possible to estimate how much collaborative research is worth to the economy based on the amount of income the University of Barcelona secures from industry each year. This income represents direct investment by private companies in research undertaken by academic researchers. It is then possible to calculate the value of this activity to the Spanish and Catalan economy by applying an assumed multiplier for the relevant group of industries.

Previous studies by BiGGAR Economics have found that companies that were involved with research contracts with universities generate an average of 360% direct GVA contribution over time to their investment in research. The increased GVA in these companies is supported by increased employment in these companies. These inputs and assumptions were used to calculate the direct contribution of private investment in research and development at the university. The total economic contribution (or value) was then calculated based on the appropriate multipliers and ratios for the industries involved.

In 2014 the University of Barcelona received €9,2 million in contract research income. The inputs used to estimate the economic contribution of contract and collaborative research are presented in Table 6.1.

Table 6.1: The University of Barcelona – Inputs for the Value of Contract and Collaborative Research

	Value	Source
Total Contract and Collaborative Research Income	€9,2M	University of Barcelona
<b>Location of Research Income</b>		
Catalonia	59%	University of Barcelona
Spain	79%	
Europe	92%	
Outside Europe	8%	
<b>Returns to Research</b>		
Direct GVA Contribution from Research	360%	BiGGAR Economics previous research

Using these inputs and applying appropriate economic ratios and multipliers as explained in the Supplementary Methodological Appendix suggests that industrial spillover effects attributable to the University of Barcelona contributes €86,6 million GVA to the European economy and supports 2.318 jobs, of which €64,0 million GVA and 1.714 jobs are supported within Spain, and €39,3 million GVA and 1.050 jobs are supported in Catalonia. This is summarised in Table 6.2.

Table 6.2: The University of Barcelona – Contribution from Contract and Collaborative Research

	GVA (€mn)	Employment
Catalonia	39,3	1.050
Spain	64,0	1.714
Europe	86,6	2.318

Source: BiGGAR Economics Analysis

## 6.3 Consultancy

One of the roles of the Bosch i Gimpera Foundation is to help transfer the knowledge and expertise of the University into industry by negotiating consultancy agreements between businesses (and other organisations) and academics. As well as the FBG, the University's Scientific and Technological Centres (CCiTUB), the Barcelona Science Park and University researchers working at affiliated University research institutes undertake consultancy contracts. The University of Barcelona undertook consultancy contracts with a value of €16,1 million, the majority of which, 87%, came from contracts with companies based in Spain.

The method used for estimating the economic contribution made by consultancy contracts is explained in detail in the Supplementary Methodological Appendix.

Table 6.3: The University of Barcelona – Inputs for the Value of Consultancy

	Value	Source
Total consultancy income	€16,1M	University of Barcelona
<b>Location of Consultancy Clients</b>		
Catalonia	67%	University of Barcelona
Rest of Spain	20%	
Rest of Europe	10%	
Outside Europe	3%	

In this way it can be estimated that consultancy projects at the University of Barcelona contribute €80,2 million GVA and support 2.480 jobs in Catalonia, €122,0 million GVA and 3.270 jobs in Spain and €159,2 million GVA and 4.301 jobs in Europe.

Table 6.4: The University of Barcelona – Economic Contribution from Consultancy Activity

	GVA (€M)	Employment
Catalonia	80,2	2.480
Spain	122,0	3.270
Europe	159,2	4.301

Source: BiGGAR Economics

## 6.4 Start-ups and Spin-outs

The University of Barcelona contributes to the economy through the creation of start-up and spin-out companies. Chapter 3 contains a discussion on the way in which universities can contribute to wider economic development in the regions in which they are located.

The University of Barcelona supports the creation of spin-out companies through the Bosch i Gimpera Foundation, which maintains a dedicated Business Creation Area. The objective of the Business Creation Area is to support the creation of technology-based businesses, knowledge-based businesses, and spin-offs. The Area is staffed by a multi-disciplinary team with considerable business experience in both Europe and America.

In 2014, there were 73 start-up and spin-out companies from the University of Barcelona, employing 395 people and an estimated turnover of €20,7 million. The economic contribution to GVA is found by converting the estimated turnover of each company into GVA by applying industry ratios. The contribution to employment is found by then applying the relevant GVA/employment ratios. The indirect contribution is calculated by applying sector-specific multipliers to these base figures.

Table 6.5: The University of Barcelona – Inputs for the Value of Start-ups and Spin-outs

Value	
Number of Start-ups/ Spin-outs	73
Direct Employment	395
Direct Turnover	€20,7 million

Source: *The University of Barcelona*

The contribution of start-ups and spin-outs is therefore estimated at €21,2 million in GVA and 794 jobs in Catalonia, €24,9 million in GVA and 934 jobs in Spain and €34,6 million and 1.121 jobs in Spain.

Table 6.6: The University of Barcelona – Contribution from Start-ups and Spin-outs

	GVA (€M)	Employment
Catalonia	21,2	794
Spain	24,9	934
Europe	34,6	1.121

Source: *BiGGAR Economics Analysis*

## 6.5 Barcelona Science Park

Many of the start-up and spin-out companies described in the previous section are located on the Barcelona Science Park (PCB), which was constituted by the University of Barcelona in 1997. The PCB was the first science park in Spain and has become the cornerstone of the University's innovation system.

The PCB now hosts nearly 50 companies, several research institutes and foundations, a bioincubator for technology-based companies and various university departments. These activities are all co-located in a 24.000 m<sup>2</sup> laboratory building with specialist equipment and facilities.

The principal focus of the international multidisciplinary research groups and companies located on the Park is biomedical: from medicinal chemistry to nanobioengineering, through to structural and cellular biology. By enabling these groups to co-locate with one another, the Park has created an environment where researchers from the public and private sectors can work side by side and share ideas. By encouraging engagement between academia and industry and across academic disciplines it is hoped that the PCB will help to create a successful biomedical cluster in Barcelona that will help Europe to compete more effectively with major biomedical clusters in the US.

In 2014 the PCB was home to 47 companies. Some of these companies were spin-outs or start-ups from the University and as the impact of these companies was considered above these people were excluded here to avoid double

counting. After doing this it was estimated that the remaining companies on the Park employ a total of 595 people. This was the starting point for estimating the economic contribution made by the PCB.

Table 6.7: The University of Barcelona – Inputs for the Value of Barcelona Science Park

	Value	Source
Number of companies on Science Park (excluding spin-outs & UB related companies)	47	University of Barcelona
Total direct employment within companies (excluding spin-outs)	595	
Additional to Catalonia	50%	BiGGAR Economics Assumption
Additional to Spain	33%	
Additional to Europe	20%	

Applying economic ratios and multipliers as in the Supplementary Methodological Appendix, results in a contribution of €29,4 million in Catalonia, €23,2 million in Spain and €19,8 million in Europe as a whole. It supports 737 jobs in Catalonia, 583 jobs in Spain and 386 across Europe as a whole (Table 6.8).

Table 6.8: The University of Barcelona – Contribution from Barcelona Science Park

	GVA (€M)	Employment
Catalonia	29,4	737
Spain	23,2	583
Europe	19,8	386

Source: BiGGAR Economics Analysis

## 6.6 Licensing

The University of Barcelona also translates research activity into economic activity through licensing agreements with industry. Licence agreements give companies the legal right to use a particular technology or other type of intellectual property (IP) to generate additional sales, reduce costs or otherwise improve their profitability. In return, companies pay royalties to the University of Barcelona.

The amount of royalties paid depends on the details of the licensing agreement and this can vary considerably from company to company. In order to agree a licensing deal, negotiators must first form a view of how much the IP is worth to the prospective licensee. There are a wide variety of variables that may inform this judgement including potential risks to the company, the technology's stage of development and any capital investment which might be required and market conditions.

In 2014, the University of Barcelona earned €0,3 million in licensing income from licence agreements for technologies. 51% of licence holders are based in Catalonia, 62% are located in Spain and 80% are located in Europe.

The Supplementary Methodological Appendix describes the methodology used to convert this into turnover and then into GVA. The accompanying contribution to employment is then calculated by dividing the GVA contribution by an estimate of

the average GVA added by each employee in these sectors. The effect of subsequent spending rounds is captured by applying GVA and employment multipliers.

Table 6.9: The University of Barcelona – Inputs for the Value of Licensing

	Value	Source
Licensing Income	€319,270	University of Barcelona
Companies located in Catalonia	51%	
Companies located in Spain	62%	
Companies located in Europe	80%	

In this way it can be estimated that the licensing activity of the University of Barcelona contributes €5,4 million GVA to the economy of Europe and supports 120 jobs, of which €3,5 million GVA and 86 jobs are supported within Spain and €2,4 million GVA and 59 jobs are supported within Catalonia. This contribution and the inputs used to calculate it are summarised in Tables 6.9 and 6.10.

Table 6.10: The University of Barcelona – Contribution from Licensing

	GVA (€M)	Employment
Catalonia	2,4	59
Spain	3,5	86
Europe	5,4	120

Source: BiGGAR Economics Analysis

## 6.7 Workforce Training (CPD)

Workforce training (or Continuing Professional Development, CPD) has a positive impact on the productivity of organisations and business through bringing about an improvement in the skills and knowledge of their employees.

However, the nature of CPD is that it will increase the productivity of an existing workforce, rather than increasing GVA by increasing employment. Therefore there would be no material increase in direct employment as a result of investing in CPD.

In 2014, the University of Barcelona received €11,5 million in income from CPD courses. Attendees based at the University were excluded from the analysis to avoid double counting.

Table 6.11: The University of Barcelona – Inputs for the Value of Workforce Training

	Value	Source
Income received from professional training	€11,5M	University of Barcelona
% of attendees who are normally based at the University	33%	
% of attendees who travelled from outside Catalonia to attend events	22%	
% of attendees who travelled from outside Spain to attend events	19%	
Private returns to CPD investment	360%	BiGGAR Economics previous research

Applying economic ratios and multipliers as previously explained, results in an economic contribution of €12,5 million in Catalonia, €12,9 million GVA in Spain and €15,9 million GVA in Europe as a whole (Table 6.12).

Table 6.12: The University of Barcelona – Economic Contribution from Workforce Training

	GVA (€M)
Catalonia	12,5
Spain	12,9
Europe	15,9

Source: BiGGAR Economics Analysis

## 6.8 Staff Volunteering

In addition to their work at the University, staff at the University of Barcelona often contribute their time to public and charitable bodies. As this time is given voluntarily and is outwith contracted working hours, the value that it generates for the economy and wider society is not captured within the direct impacts of the University.

Staff from the University of Barcelona undertake a wide variety of volunteering roles but in many cases their ability to contribute in this way is directly associated with their professional expertise and association with the University. For this reason it is appropriate to attribute the value of this activity to the University.

One area in which staff from the University of Barcelona have been particularly active is in providing advice and guidance to government at various levels. At the city level, academics at the University have been influential in a wide range of policy areas ranging from transport infrastructure to the efficiency of the health care system. Academics from the University have also been particularly influential on policy makers from the Catalan Government, particularly as a result of their participation in the Catalan Government's Advisory Council.

This Advisory Council was set up in 2011 to advise the Catalan Government on the guide the national transition process of Catalonia and achieving a Catalan self-determination referendum. Its purpose is to:

- analysing and identifying all the available legal alternatives regarding the issue

of national transition;

- advising the Government of Catalonia in identifying the strategic structures for the functioning of the Government and the Catalan institutions in the future, as well as the optimisation of available resources;
- proposing actions and promoting the dissemination of the process of national transition among the international community and identifying support therein; and
- advising the Government of Catalonia with the coordination of institutional relations in Catalonia to guarantee the entire process.

The Advisory Council is comprised of 15 leading figures from the academic, business and professional worlds, five of whom are from the University of Barcelona.

The time that staff contribute to external bodies, such as the Advisory Council, also benefits the University itself as it allows staff to further develop their skills in a non-university environment. For example, an academic member of staff contributing to a committee assessing research funding applications will simultaneously develop their own application writing skills.

The proportion of time that staff contribute to such activity is likely to vary and is not routinely collected and analysed. However, to give some indication of its value, it has been assumed by BiGGAR Economics that the time staff work on social and voluntary activities is equivalent to 7,5% of their working hours (approximately 2,5 hours per week). Therefore the costs which would be associated with this, if the public and charitable bodies were to pay equivalently qualified people, is equivalent to 7,5% of the total staff costs of the University. This takes into account that more senior staff are likely to spend a higher proportion of their time on such activities, while junior staff are unlikely to spend as much time.

Using these inputs and applying appropriate economic ratios and multipliers as explained in the Supplementary Methodological Appendix suggests that the total value of staff time which is given voluntarily to external organisations is €19,8 million GVA in Spain and €19,8 million GVA in Europe. As with student volunteering, the nature of this type of activity is that it will contribute to increasing productivity of the organisations volunteered for and therefore will have a GVA impact rather than an employment impact.

Table 6.13: University of Barcelona – Economic Contribution from Staff Volunteering

	GVA (€M)
Catalonia	19,8
Spain	19,8
Europe	19,8

Source: BiGGAR Economics Analysis

## 6.9 Summary of Knowledge Transfer, Enterprise and Innovation Contributions

The combined contribution due to knowledge transfer, enterprise and innovation activity generated by and sustained by the University of Barcelona is €204,9 million and 5.119 jobs in Catalonia, €270,3 million and 6.588 jobs in Spain and €338,6 million 8.247 jobs across Europe (Table 6.14).

Table 6.14: The University of Barcelona – Contribution from Knowledge Transfer Activities

	GVA (€M)	Employment
<b>Catalonia</b>		
Contract and Collaborative Research	39,3	1.050
Consultancy	80,2	2.480
Spin-outs and Start-Ups	21,2	794
Barcelona Science Park	29,4	737
Licencing	2,4	59
Workforce Training (CPD)	12,5	-
Staff Volunteering	19,8	-
<b>Total Knowledge Transfer Contribution</b>	<b>204,9</b>	<b>5.119</b>
<b>Spain</b>		
Contract and Collaborative Research	64,0	1.714
Consultancy	122,0	3.270
Spin-outs and Start-Ups	24,9	934
Barcelona Science Park	23,2	583
Licencing	3,5	86
Workforce Training (CPD)	12,9	-
Staff Volunteering	19,8	-
<b>Total Knowledge Transfer Contribution</b>	<b>270,3</b>	<b>6.588</b>
<b>Europe</b>		
Contract and Collaborative Research	86,6	2.318
Consultancy	159,2	4.301
Spin-outs and Start-Ups	34,6	1.121
Barcelona Science Park	17,2	386
Licencing	5,4	120
Workforce Training (CPD)	15,9	-
Staff Volunteering	19,8	-
<b>Total Knowledge Transfer Contribution</b>	<b>338,6</b>	<b>8.247</b>

Source: BiGGAR Economics Analysis

## 6.10 Wider Impact of Knowledge Transfer Activity

This chapter has described the economic contribution generated by the different types of knowledge transfer activity undertaken by the University of Barcelona but the approach taken was to consider each area of activity in isolation. In reality however these areas of activity are not undertaken in isolation but as components of a broader innovation ecosystem. Simply considering the individual contribution of each different type of activity therefore ignores the dynamic effects that occur as a result of interaction *between* the different areas of activity.

Nowhere are these dynamic effects more apparent than at the Barcelona Science Park. As discussed above the focus of the PCB is on creating a collaborative, multi-disciplinary environment that encourages engagement between industry and academia. To help achieve this the University has chosen to locate much of its knowledge transfer infrastructure (the Bosch i Gimpera Foundation, incubation facilities, the Patents Centre) as well as many important research groups on-site.

By locating these institutions on-site the University has made it much easier for academic and industrial researchers to meet with and learn from one another. This helps to generate opportunities for collaborative activity that may not otherwise arise and means that the total contribution that the University's innovation system makes to society is greater than the sum of its parts.

Building on this success the University of Barcelona is now trying to apply the lessons it has learned to other strategic locations within the city of Barcelona and its metropolitan area. This would be the case, for example, of the University of Barcelona actions at the Bellvitge Campus thanks to the already on-going synergies established between the University of Barcelona and Bellvitge Hospital, the Bellvitge Biomedical Research Institute (IDIBELL) and the Catalan Institute of Oncology.

## 7 TOURISM CONTRIBUTION

This section considers the contribution that the University of Barcelona makes to tourism in the area. This contribution arises from:

- visits from friends and family to staff and students; and
- visitors who come to Barcelona to attend conferences or other events held at the University.

### 7.1 Visits to Staff and Students

The presence of staff and students in the area creates an economic contribution through visits from their friends and family. These visitors spend money in the economy and this spending increases turnover in local businesses which in turn supports local employment.

The contribution of visits to staff and students has been calculated by assessing the number of visits from friends and family per head of the population as estimated by the Eurostat data for 2012.

We then applied this ratio to the total number of staff and students at the University of Barcelona. Next, we applied an estimate of trip expenditure per visit. The economic contribution in the study areas was found by converting trip spend (turnover) to GVA and employment and applying multipliers to estimate the indirect and induced effect of this level of spending. The inputs used and the resulting contribution is shown in Tables 7.1 and 7.2.

This results in an estimated economic contribution from visits to staff and students of €3,5 million GVA and 112 jobs in Catalonia, €4,2million GVA and 133 jobs in Spain and €5,1 million GVA and 155 jobs in Europe as a whole.

Table 7.1: The University of Barcelona – Inputs for Visits to Staff and Students

	Value	Source
Total number of staff & students (FTEs)	55.112	University of Barcelona
No. of visits per staff/student	0,93	Eurostat
Total number of visits from friends and family	50.983	BiGGAR Economics calculation
Trip spend per visitor	€100,4	Eurostat

Table 7.2: The University of Barcelona – Contribution from Visits to Staff and Students

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	1,7	49
Indirect Contribution	1,8	63
Total Visitor Contribution	3,5	112
<b>Spain</b>		
Direct Contribution	1,7	49
Indirect Contribution	2,5	84
Total Visitor Contribution	4,2	133
<b>Europe</b>		
Direct Contribution	1,7	49
Indirect Contribution	3,4	106
Total Visitor Contribution	5,1	155

Source: BiGGAR Economics Analysis

## 7.2 Conference & Event Contribution

The University of Barcelona organises conferences that generate an economic contribution by attracting people to the area who would not otherwise have visited.

The University of Barcelona organised numerous conferences and events in 2014, which involved approximately 22.800 attendees. However, this is a very rough estimation of the number of attendees to events at the University and is therefore likely to be a significant underestimate. 5% of these attendees were assumed to be from outside Europe and a further 10% were assumed to be from outside Spain. 25% were assumed to be from the immediate area and their expenditure was therefore not additional.

Applying expenditure data on business trips from Eurostat data, we can estimate the additional total turnover generated by people attending conferences organised by the University of Barcelona. This is converted to additional GVA and employment by using ratios and multipliers appropriate to the sector.

The inputs used are shown in Table 7.3 and the resulting contribution is presented in Table 7.4.

Table 7.3: The University of Barcelona – Inputs for Conferences &amp; Events

	Value	Source
No. of delegates to organised conferences and events at the University of Barcelona	22.800	University of Barcelona estimate
Average duration of each event (days)	2	BiGGAR Economics Assumption
Estimated % of attendees normally based at the University	25%	
Estimated % of attendees who travelled from outside Netherlands	10%	
Estimated % of attendees who travelled from outside Europe	5%	
Trip spend per visitor on business	€136,0	Eurostat

This results in an economic contribution from conferences of an estimated €2,0 million GVA and 65 jobs in Catalonia, €2,4 million GVA and 77 jobs in Spain and €2,9 million GVA and 89 jobs in Europe as a whole.

Table 7.4: The University of Barcelona – Contribution from Conferences &amp; Events

	GVA (€M)	Employment
<b>Catalonia</b>		
Direct Contribution	1,0	28
Indirect Contribution	1,1	36
Total Conferences Contribution	2,0	65
<b>Spain</b>		
Direct Contribution	1,0	28
Indirect Contribution	1,4	48
Total Conferences Contribution	2,4	77
<b>Europe</b>		
Direct Contribution	1,0	28
Indirect Contribution	2,0	61
Total Conferences Contribution	2,9	89

Source: BiGGAR Economics Analysis

### 7.3 Summary of Tourism Contributions

The contribution of the University of Barcelona to the economy through attracting visitors results in an estimated €5,6 million additional GVA and 176 jobs per year in Catalonia, €6,6 million additional GVA and 210 jobs per year in Spain, and €8,1 million GVA and 245 jobs across Europe as a whole.

Table 7.5: The University of Barcelona – Economic Contribution from Tourism

	GVA (€M)	Employment
<b>Catalonia</b>		
Visits to Staff and Students	3,5	112
Visits to Conferences and Events	2,0	65
<b>Total Tourism Contribution</b>	<b>5,6</b>	<b>176</b>
<b>Spain</b>		
Visits to Staff and Students	4,2	133
Visits to Conferences and Events	2,4	77
<b>Total Tourism Contribution</b>	<b>6,6</b>	<b>210</b>
<b>Europe</b>		
Visits to Staff and Students	1,7	49
Visits to Conferences and Events	2,9	89
<b>Total Tourism Contribution</b>	<b>8,1</b>	<b>245</b>

Source: BiGGAR Economics Analysis

## 8 GRADUATE PREMIUM

### 8.1 Graduate Premium

One of the most important ways universities generate economic impact is through their graduates. The skills students learn and the experiences they have while at university directly enhances their future productivity. This enables them to contribute more to their employer and generate a greater benefit for the national economy than they would otherwise be able to.

The GVA of this productivity gain includes the additional profits that graduate employers are able to generate by employing graduates and the additional employment costs they are willing to pay in order to generate these additional profits.

As the subject of graduate earnings premiums has been well researched information about the earnings premium of graduates is readily available and can be used to provide a measure of the additional contribution graduates make to the economy each year. Unfortunately information about the additional profits of graduate employers or the additional taxation revenue they help to generate is not readily available so the impact presented in this section is likely to underestimate the true productivity impact of learning.

Information about the graduate premium for different subject areas is provided in a research paper produced by the Department for Business Innovation & Skills<sup>7</sup>, which considered data from the Labour Force Survey between 1996 and 2009. Although the data used in the report is now somewhat dated, evidence from the OECD<sup>8</sup> suggests that returns to higher education are fairly consistent over time. For this reason, the report remains the most robust and comprehensive source available for estimating this impact.

The analysis considered the after tax earnings of a graduate compared to the after tax earnings of a non-graduate. Direct costs, such as tuition fees less student support, and indirect costs, such as foregone earnings, were then subtracted from the gross graduate premium for each degree subject to give the net graduate premium.

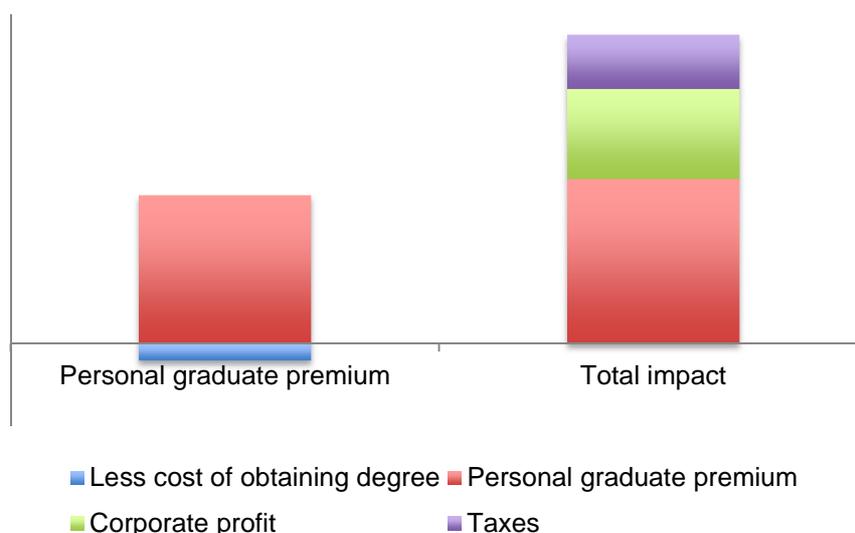
In this way the total graduate premium gives the combined personal economic benefit that the years graduates will obtain but excludes corporate economic benefits (such as profit and long-term growth) and additional taxes paid to the government. As the total benefit that graduates generate for the national economy includes corporate and societal benefits as well as personal economic benefits the impact quantified in Figure 8.1 therefore underestimates the full economic contribution of graduates from the University of Barcelona.

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<sup>7</sup> Department for Business Innovation & Skills (June 2011), The Returns to Higher Education Qualifications.

<sup>8</sup> OECD, Education at a Glance: OECD Indicators series

Figure 8.1: Personal Graduate Premium Benefit Vs. Economic Benefit



## 8.2 Estimating the Graduate Premium

Looking specifically at the educational aspect of the work of the University of Barcelona, there is a lifetime earnings premium generated by training graduates across a spectrum of subjects that occurs as a direct result of an individual possessing a university qualification.

The economic value of teaching and learning are a different kind of contribution, compared to the others described in previous chapters, because this contribution occurs over the *working lifetime of graduates* rather than in the year of their graduation. These contributions would not have been realised in 2014, which is the year our analysis covers. However, in 2014 graduates from previous years will be creating these contributions and this has not been captured elsewhere in this study. Therefore the future contribution of the 2014 cohort of graduates have been quantified and added in to ensure that the full contribution of teaching and learning is reflected in the analysis.

The key inputs used in estimating the value of the graduate premium are shown in Table 8.1 and the full description of how these were applied can be found in the Supplementary Methodological Appendix.

Table 8.1: The University of Barcelona – Inputs for Graduate Premium

	Value	Source
Total number of first degree graduates	7.582	University of Barcelona
Total number of postgraduate degree graduates	3.299	
% graduates living in Catalonia	75%	BiGGAR Economics Assumption
% graduates living in Spain	95%	
% graduates living in Europe	98%	

This results in an estimated contribution of €522,3 million in Catalonia, €661,5 million in Spain and €682,4 million in Europe as a whole as a result of people graduating in any subject from the University of Barcelona in 2014.

As this contribution is a productivity gain it is measured in terms of GVA and consequently does not have associated employment gains.

Table 8.2: The University of Barcelona – Graduate Premium Contribution

	GVA (€M)
Catalonia	522,3
Spain	661,5
Europe	682,4

Source: *BiGGAR Economics Analysis*

This contribution is expressed only in terms of GVA because it relates only to the personal economic benefit associated with individual graduates. Limited data availability means that it is not possible to fully capture the wider benefits that these graduates generate either for the companies they work for (in terms of profit or higher growth rates) or society as a whole (in terms of additional taxes paid).

It is however important to note that higher levels of graduate productivity are likely to have important long-term effects on national economic performance. For example, by helping to improve long-term performance, more productive graduates should help to increase company growth rates, which could result in companies recruiting additional staff. It is also likely that some graduates will go on to establish successful start-up businesses that generate wealth and create employment in their own right (the impact of such businesses was considered in section 6.4).

## 9 SUMMARY

### 9.1 Total Contribution

By bringing together the various sources of economic value discussed in this report it can be estimated that the University of Barcelona contributes:

- GVA of €1,4 billion and supports 21.868 jobs in Catalonia;
- GVA of €1,7 billion and supports 26.537 jobs in Spain; and
- GVA of €1,8 billion and supports 29.652 jobs in Europe as a whole.

In 2014 the University of Barcelona directly contributed €312,4 million to the European economy and generated a total quantifiable contribution of €1,8 billion GVA. This implies that the GVA multiplier of the University is 5,92 and means that each €1 GVA directly generated by the University contributes €5,92 to the European economy.

The University of Barcelona supported 29.652 jobs in Europe, which includes 6.148 people directly employed by the University. This implies that each job directly created by the University supported more than 4,82 jobs throughout Europe.

In 2014 the University of Barcelona received €372,2 million in income and generated a total economic contribution of €1,8 billion GVA. This implies that the University generated €4,97 for every €1 income earned.

A breakdown of all economic contributions that can be quantified is provided in Table 9.1.

Table 9.1: The University of Barcelona – Summary of Economic Contributions

	Catalonia		Spain		Europe	
	GVA (€M)	Jobs	GVA (€M)	Jobs	GVA (€M)	Jobs
<b>Core Contribution</b>	<b>419,5</b>	<b>9.780</b>	<b>474,9</b>	<b>11.866</b>	<b>486,5</b>	<b>12.331</b>
Direct Effect	312,4	6.148	312,4	6.148	312,4	6.148
Supplier Effect	23,7	927	40,2	1.592	45,4	1.889
Staff Spending Effect	76,9	2.561	112,4	3.906	118,7	4.074
Capital Spending	6,4	144	10,0	220	10,0	220
<b>Student Contribution</b>	<b>246,4</b>	<b>6.794</b>	<b>284,1</b>	<b>7.873</b>	<b>333,4</b>	<b>8.829</b>
Student Spending	173,2	4.650	204,4	5.525	243,2	6.153
Part-time Work	17,7	758	19,3	832	21,7	965
Student Volunteering	0,6	-	0,6	-	0,6	-
Student Placements	54,8	1.385	59,8	1.516	67,9	1.712
<b>Knowledge Transfer Contribution</b>	<b>204,9</b>	<b>5.119</b>	<b>270,3</b>	<b>6.588</b>	<b>338,6</b>	<b>8.247</b>
Contract and Collaborative Research	39,3	1.050	64,0	1.714	86,6	2.318
Consultancy	80,2	2.480	122,0	3.270	159,2	4.301
Spin-outs and Start-ups	21,2	794	24,9	934	34,6	1.121
Barcelona Science Park	29,4	737	23,2	583	17,2	386
Licensing	2,4	59	3,5	86	5,4	120
Workforce Training (CPD)	12,5	-	12,9	-	15,9	-
Staff Volunteering	19,8	-	19,8	-	19,8	-
<b>Tourism Contribution</b>	<b>5,6</b>	<b>176</b>	<b>6,6</b>	<b>210</b>	<b>8,1</b>	<b>245</b>
Visits to Staff & Students	3,5	112	4,2	133	1,7	49
Conferences & Events	2,0	65	2,4	77	2,9	89
<b>Sub-Total</b>	<b>876,3</b>	<b>21.868</b>	<b>1.035,9</b>	<b>26.537</b>	<b>1.166,8</b>	<b>29.652</b>
Graduate Premium	522,3	-	661,5	-	682,4	-
<b>Total</b>	<b>1.398,6</b>	<b>21.868</b>	<b>1.697,4</b>	<b>26.537</b>	<b>1.849,0</b>	<b>29.652</b>

Source: BiGGAR Economics Analysis, figures may not total due to rounding

## 9.2 Components of Economic Contribution

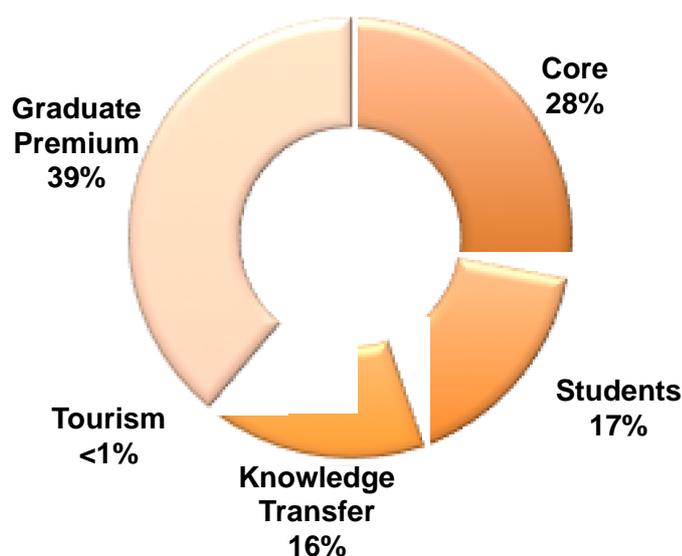
The figure below shows that the largest type of contribution generated by the University of Barcelona is that associated with the lifetime earnings of its graduates, reflecting the economic value of the teaching and learning experienced at the University. This graduate premium provides almost 40% of the institution's economic contribution, at €661 million GVA in the Spanish economy.

Core operations such as direct employment, expenditure on supplies, staff expenditure and capital expenditure account for 28% of economic contribution at

the national level, providing €475 million in GVA and almost 11.900 jobs to the Spanish economy.

Students also create economic benefits when they come to live, study and work in Barcelona, bringing with them considerable spending power. They deliver 17% of the economic contribution of the University, providing over €200 million in GVA and over 6.600 jobs to the Spanish economy.

Figure 9.1 – GVA Contributions by Source, Spain



The University of Barcelona delivers a strong economic contribution as a result of knowledge transfer activities, including licensing, consultancy, research, new companies, its science park, workforce training and staff volunteering. Together, these activities contribute almost €300 million in GVA and over 7.200 jobs to the Spanish economy, making up 16% of the University's overall economic contribution to Spain. The scale of this contribution demonstrates the importance of the University to the Catalan R&D system, and its potential to deliver the objectives of the Catalan Research and Innovation Plan.

Of course, Barcelona is an important tourism destination. The University contributes to the city's success as an attractive destination, with an economic benefit to the Spanish tourism sector of almost €6 million in GVA and 174 jobs.

## 10 CONCLUSIONS

This study presents the economic contribution of the University of Barcelona for the academic year 2013-14. The report has highlighted the University's major economic characteristics, including revenue generated, employment created and economic output. The analysis has modelled the economic activity in other sectors that is generated through the effects of expenditure by staff, students and visitors. It has reviewed the economic contribution of the University's research activity and its collaboration with businesses.

The University of Barcelona, as a research-intensive university, has a crucial role as a driver of long-term sustainable economic growth. Economic growth in advanced economies is driven by productivity growth, which is in turn driven by knowledge and innovation. Research universities have a unique role to play in this by pushing the boundaries of academic discovery, expanding the pool of knowledge available to society and, at least as importantly, by diffusing this knowledge throughout the economy to provide the basis for future productivity improvements and therefore economic growth. Research universities support the diffusion of knowledge by providing high quality graduates for the labour market as well as through their commercialisation activities. In doing so they contribute to the strategic aim of Horizon 2020, to achieve economic growth and create jobs by investing in research and innovation.

Moreover, research universities create highly successful innovation ecosystems that are major clusters of activity. They provide a space for discussion and create connections between academics, students and companies. They make the regions they are located in attractive places for investment. The innovation ecosystem of Catalonia is built on the world-class research undertaken at the University of Barcelona, as it is this that attracts students, researchers, businesses and investment, helping to catalyse innovation and create the knowledge sectors of the future.

The University of Barcelona therefore plays a key role in driving the regional innovation landscape. In 2012, the University of Barcelona was a leader in applications for utility models<sup>9</sup> with 18.8% of the total for Spain, with the number of patents listed for Barcelona at 14.5% of the Spanish total<sup>10</sup>. In 2011 Catalonia was home to the highest number of innovative companies in Spain (22.2%) and in 2012 Barcelona was in fourth position in Europe and sixteenth worldwide for scientific production.

The analysis presented in this report demonstrates the University of Barcelona's fundamental importance to the wider economic landscape of Catalonia and Spain. The analysis shows that the University delivers a huge economic contribution, supporting almost 22.000 jobs in Catalonia and over 26.000 jobs in Spain.

The sheer scale of the economic contribution of universities places higher education among the most important industrial sectors, with the University of Barcelona clearly a powerful driver of economic growth in the region. There is no doubt that the University forms a core part of the economic infrastructure and it

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<sup>9</sup> Utility models are defined in the Spanish Patent Act as inventions that are new and involve an inventive step and that confer a form, structure or constitution on an object that results in an appreciable improvement in its use or manufacture.

<sup>10</sup> Barcelona Data Sheet 2013, Main economic indicators for the Barcelona area, Barcelona City Council,

[http://www.cefg.eu/files/repository/20141014144126\\_BarcelonaDataSheet\\_eng.pdf](http://www.cefg.eu/files/repository/20141014144126_BarcelonaDataSheet_eng.pdf)

should be seen as a generator of significant wealth for Catalonia and Spain, rather than a consumer of public funds.

This study provides an important reminder of the very tangible impact made by the University:

- as an **educator**, the University of Barcelona attracts students to the city from other parts of Spain and across the world. In fact, with over 6.500 full time international students, the University attracts a large proportion of Catalonia's total international student body<sup>11</sup>. Students' spending supports the local and regional economy and Spain's future economic growth will depend on investment in graduate-level skills;
- as a **leading research institution**, the University attracts funding for research into the region and generates internationally significant research with social and economic impacts as well as fuelling innovation and business growth. At the national level the University does this by promoting a collaborative approach to research that encourages academics to engage with industry and actively seek opportunities for collaborative ventures. Central to this has been the physical co-location of important areas of research activity with key industrial partners, like at the Barcelona Science Park and around the Bellvitge Health Sciences Campus and the Medicine-Hospital Clinic Campus. As a result of this collaborative approach the University has been instrumental in the creation of a highly successful bio-medical cluster that has become an important driver of growth for the Catalan and wider Spanish economies. In fact, as the "engine of medical technology research" in the country, Catalan biotechnology companies make up over 20% of the Spanish total<sup>12</sup>;
- as a main **health related agent** associated with its involvement in the big University Hospitals of Barcelona (Hospital Clinic, Bellvitge Hospital and other associated centres) and the role of the Hospitals of Dentistry and Podiatry and the Clinics of Psychology of the University of Barcelona;
- as one of Barcelona's **major employers** the University provides a large number of highly skilled jobs. Indeed, more than half of the jobs in the city (53.1%) are in knowledge intensive areas<sup>13</sup> and the presence of this major research intensive university is important in maintaining this important labour market segment. In addition, it buys goods and services, invests in capital development and facilitates the spending of staff, students and visitors in the region – all creating and supporting additional jobs. The University's capital investment strategy has helped to transform whole neighbourhoods, driving urban regeneration across the city and bringing further benefits, beyond the scope of this study.

While the analysis has quantified the economic contribution of the University of Barcelona, which is significant, there are number of additional benefits, which are not possible to quantify, but which will have important long term beneficial economic impacts. These include the major contribution the University makes to

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<sup>11</sup> In 2011-12 there were estimated to be 15.756 foreign students in Catalan public universities (source: Barcelona Data Sheet). Should these figures be maintained to 2014, UB would attract 42% of Catalonia's international students.

<sup>12</sup> Barcelona Data Sheet 2013, Main economic indicators for the Barcelona area, Barcelona City Council, [http://www.cefg.eu/files/repository/20141014144126\\_BarcelonaDataSheet\\_eng.pdf](http://www.cefg.eu/files/repository/20141014144126_BarcelonaDataSheet_eng.pdf)

<sup>13</sup> Ibid.

the wider economy by improving the life chances of individuals and its social and cultural benefits. The University opens its doors to businesses and local communities, providing space for public debate, access to art, music, theatre and sports facilities. Academics at the University make a contribution to the economic leadership of Catalonia by participating in a number of advisory forms. These social and cultural contributions, although not quantifiable, must not be overlooked.

The University of Barcelona is essential for a vibrant city economy and as a driver of innovation and business development across the region. The economic analysis provided in this report provides a strong case for a continued investment in the University because it:

- is an anchor institution in Barcelona, creating local jobs, supporting local innovation and attracting talent and investment;
- provides a major economic contribution to the city, to Catalonia, to Spain and to Europe;
- transforms lives through education and through the wider impact of its research;
- provides employers with a skilled workforce by producing graduates with the skills and knowledge employers need;
- undertakes world leading research providing a strong return on investment;
- undertakes research in Barcelona that stimulates the creation and development of new businesses and jobs and enriches society and culture;
- has an international reach that helps maintain Catalonia's and Spain's global influence; and
- helps to ensure that Catalonia and Spain remain competitive in the global market by supporting business innovation and knowledge-intensive growth.

The scale and scope of the contribution made by the institution suggests that the University of Barcelona is essential, not optional, for the future social and economic success of Barcelona, Catalonia and Spain.

## APPENDIX A – ABBREVIATIONS AND TERMS

This section contains a list of common abbreviations and terms used in this report.

**Assumptions** are the data upon which calculations are based.

**FTE (or fte) – Full Time Equivalent** a unit to measure employed persons or students in a way that makes them comparable although they may work or study a different number of hours per week. The unit is obtained by comparing an employee's or student's average number of hours worked to the average number of hours of a full-time worker or student. A full-time person is therefore counted as one FTE, while a part-time worker / student gets a score in proportion to the hours he or she works or studies. For example, a part-time worker employed for 20 hours a week where full-time work consists of 40 hours, is counted as 0,5 FTE.

**GDP – Gross Domestic Product** refers to the market value of all final goods and services produced within a Country in a given period.

**GVA – Gross Value Added** is also a measure of the value of goods and services produced in an area, industry or sector. GVA is linked to Gross Domestic Product (GDP) because both are measures of output. The relationship is defined as:

$GVA + \text{taxes on products} - \text{subsidies on products} = GDP$

As the total aggregates of taxes on products and subsidies on products are only available at whole economy level, GVA is used for measuring entities smaller than a whole economy (such as universities). In simple terms at the level of an organisation, it is represented by turnover less the non-labour costs of production.

**GVA/turnover ratio** is a measure of the relationship between the total turnover of a particular sector and the GVA it generates. It is calculated by dividing total GVA by total turnover and can be used to estimate how much GVA will be created as a result of an increase in output (turnover or expenditure).

**Spin-outs** are companies that are created to commercialise a university's intellectual property; usually involving a licensing agreement and/or staff transfer.

**Start-ups** are businesses that are set up by university staff and/or former students. Although such companies will draw on the experience acquired by the founders during their time at the university, they have no formal intellectual property relationship with the university.