BiGGAR Economics

The Economic Contribution of Aurora

March 2026

AURORA

BiGGAR Economics

Contents

1. Executive Summary

Aurora members collectively generate an economic contribution worth at least €21.1 billion Gross Value Added (GVA) for the European economy, supporting 165,000 jobs. This is created from learning and valorisation and from members' direct operations and students.

Every direct job supported by Aurora members supports a further 5 jobs in the European economy.

Table 1-1: Aurora Economic Contribution Summary, 2024

	European Economy (Europe)	
	GVA (€ billion)	Employment (Jobs)
Learning	7.7	4,000
Valorisation	1.1	6,000
Operational	6.2	67,000
Student	6.0	88,000
Total	**21.1**	**165,000**

Source: BiGGAR Economics Analysis. Note: Figures may not sum due to rounding.

1.1 The Added Value of the Aurora Network

Aurora is comprised of nine European universities and is designed to deliver a cohesive and collaborative network system that generates benefits for society beyond which any one member could do in isolation. **Collectively, the aggregate power of Aurora members generated €21.1 billion GVA for the European economy in 2024.** This arose from activities relating to the day-to-day operation of universities, employment and spending habits of their staff and students, valorisation of commercial services and research undertaken, and the expected productivity gains associated with Aurora member graduates over their working lifetime.

Despite being in its relatively early stages of operation as a network, Aurora is already evidencing signs of added value in terms of additional income, collaborative research, and student and staff mobility. Based on similar network institutions, over the long-term Aurora can be expected to experience outcomes that are in line with the network's strategic objectives.

1.2 Learning

Aurora members generate learning benefits through three primary channels: the salary premiums achieved by their graduates, the provision of professional education, and student internships.

- The **59,880 graduates** of Aurora members in 2024 are expected to receive personal benefits from their experience studying as part of the network. This comes in the form of higher earnings from the degree they have earned and the experiences they had throughout their study to prepare them for the workforce, resulting in greater productivity. It was estimated that the **graduate productivity generated by 2024 Aurora member graduates over their lifetime could be worth at least €7.3 billion GVA across Europe**.
- Aurora values professional education as a key priority, recognising that workplaces need to adapt as technology continues to change the national economies. It supports working people to develop new skills and update those they already have. **Professional education offered by Aurora members contributes at least €134 million GVA and supports 200 jobs across Europe.**
- Internships offer significant advantages to students, to the organisations that host them, and to the university by promoting collaboration with employers. **Student internships organised by Aurora members contribute at least €236 million GVA and supports 3,600 jobs across Europe.**

1.3 Valorisation

Valorisation ensures that Aurora members' research and teaching expertise benefits society and supports economic growth. Each Aurora member maintains a strong commitment to this goal, investing in people, structures, and initiatives that drive societal impact. These efforts are supported by experienced technology transfer teams and dedicated facilities.

- One of the ways in which Aurora members' research can be translated into economic activity is through licensing agreements with industry. **Aurora members contributes €26 million GVA and supports 500 jobs across Europe through licencing activities.**
- Aurora members have established an estimated 240 start-up and spin-out companies, directly employing approximately 900 staff. **Spin-out and start-up companies associated with Aurora members contribute at least €196 million GVA and supports 2,400 jobs across Europe.**
- Aurora members promote knowledge transfer through interactions with businesses. This includes consultancy work, commissioned research, and access to facilities and equipment hire. Such services generate an income of around €79 million. **Aurora members contribute at least €701 million GVA and supports 1,300 jobs across Europe by providing services to businesses and public organisations.**
- Aurora supports a range of science parks and incubators across its member hosts. All are embedded within regional partnerships and play a major role in

driving local innovation ecosystems. **Member-based science parks and incubators contribute at least €181 million GVA and support 2,100 jobs across Europe.**

Estimates of the value of valorisation are likely to understate the true scale of the contribution made by Aurora, as the network's goal of achieving societal benefit goes beyond that which can solely be measured in economic terms.

1.4 Operations

As a large employer with an extensive supply chain and staff complement, Aurora has a sizeable economic footprint across Europe.

- As part of their core activities, Aurora members generate economic activity through daily operations, inclusive of direct, supply chain, staff spending and capital expenditure contributions. Aurora members receive a combined annual income of €3.8 billion, directly employ 33,970 members of staff, and spend around €901 million on goods and services. **Collectively, core activities contribute at least €6.1 billion GVA and 65,200 jobs across Europe.**
- Aurora members support tourism through friends and family visiting staff and students and hosting conferences and events. **Tourism-related activities stimulated by Aurora contribute at least €97 million GVA and 1,600 jobs across Europe.**

1.5 Students

The **274,410 students** that study at Aurora members make an economic contribution through their day-to-day spending, part-time employment, and volunteering activity.

- From their **daily spending** during term-time, supports the turnover of local businesses, students at Aurora members are estimated to contribute **€2.8 billion GVA and 30,200 jobs across Europe.**
- **Part-time employment** of Aurora member students alongside their studies is estimated to contribute **€3.2 billion GVA and 58,100 jobs across Europe.**
- **Volunteering activity** is estimated to support **€34 million GVA across Europe**.

1.6 Conclusions

Aurora is a European university network that is in its relatively early stages of growth and influence, yet one which evidences collaboration towards a common purpose. Having only operated as a collective for around five years, several of which were influenced by global events halting typical operations, **Aurora enhances the mobility of its students and staff across Europe, supports revenue generation for its members, and facilitates cross-country research and innovation. Its network of nine member universities collectively generate €21.1 billion GVA, and support 165,000 jobs across Europe**. Supporting this scale of impact, both now and in the future, relies on the network capitalising on its collective ambitions to ensure additional benefits are secured.

2. Introduction

This section introduces Aurora, explains the aims of the study, and outlines its scope.

BiGGAR Economics was commissioned by Aurora to highlight the collective economic contribution its members made to the European economy in 2024. This represents the aggregate power of each members' operations, students, learning, and valorisation activities.

2.1 Background

2.1.1 Aurora

Formed in 2016, Aurora represents a partnership of nine research-intensive European universities that seek to use their academic excellence to drive societal change[1] and contribute to the United Nations Sustainable Development Goals (SDGs).[2]

It seeks to achieve this goal through **education**, by equipping a diverse student population with the necessary skills and mindset to address societal challenges[3], and **research**, chiefly through the Aurora Research and Innovation for Societal Impact, set up in 2021 to allow Aurora to add a research dimension to its joint activities[4]. Aurora's strategic priorities include:

- **Teaching and Learning for Societal Impact;**
- **Excellent Challenge-based Research and Innovation;**
- **Collaboration and Engagement through Inclusive Communities; and**
- **Sustainability Pioneers**[5].

Aurora is currently comprised of:

- nine universities;
- 274,410 full-time students;
- 33,970 employees;
- 112 faculties; and
- 813 research groups[6].

The members of Aurora are shown in Table 2-1, with their location illustrated in Figure 2-1.

[1] Aurora (2024), Aurora Alliance – Research and Innovation for Societal Impact.
[2] United Nations (2025), *The 17 Goals.* Available at: https://sdgs.un.org/goals
[3] European Commission (2022), European Universities Initiative factsheet - Aurora
[4] Aurora (2025), *Aurora Research and Innovation*. Available at: https://aurora-universities.eu/aurora-research-and-innovation/
[5] Aurora (2025), *Aurora 2030 Project*. Available at: https://aurora-universities.eu/about/aurora-2030/
[6] Aurora (2025) *Aurora*. Available at: https://aurora-universities.eu/

Table 2-1: Aurora Members

University	Country
Vrije Universiteit Amsterdam (VU Amsterdam)	Netherlands
University of Iceland	Iceland
Universität Duisburg-Essen (UDE)	Germany
L'Università degli Studi di Napoli Federico II	Italy
Universitat Rovira i Virgili (URV)	Spain
Universität Innsbruck	Austria
Palacký University Olomouc (UP)	Czech Republic
Copenhagen Business School (CBS)	Denmark
Université Paris-Est Créteil (UPEC)	France

Source Aurora (2025), *Aurora*. Available at: https://aurora-universities.eu/

Figure 2-1: Geographic Location of Aurora Members

In addition, Aurora has associated partners (Table 2-2). The four European associate partners listed in the table below have not been included as part of the analysis for this study.

Table 2-2: Associate Partners

University	Country
University of Tetova	North Macedonia
South-West University "Neofit Rilski"	Bulgaria
Pavol Jozef Šafárik University in Košice	Slovakia
V. N. Karazin Kharkiv National University	Ukraine

Source: Aurora (2026), Aurora. Retrieved from: https://aurora-universities.eu/

2.1.2 European Universities Initiative: Why Was Aurora Selected?

The European Commission launched the European Universities Initiative (EUI) in 2018, under the Erasmus+ programme, to build long-term partnerships between universities across Europe that go beyond individual projects and work together through shared governance, joint strategies, and integrated activities. EUI supports the goals of the European Education Area and links the European Research Area and European Innovation Agenda.

By 2025, the EUI included 65 university alliances, bringing together more than 570 higher education institutions across 35 countries. Each alliance receives up to €14.4 million from Erasmus+ for four years, and act as models to shape the future - where mobility, joint learning, open science and societal engagement are built into how universities operate[7].

Aurora was selected in 2020, as it already brought together like-minded, socially engaged, research universities committed to combining academic excellence with societal impact[8]. Aurora's aforementioned strategic priorities align with the European Commission's broader goals, and the European Commission recognised an opportunity to build on an existing partnership that could demonstrate new ways of working together across national systems. Aurora was seen as well placed to test this, providing practical lessons for the transformation of higher education across Europe.

[7] Publications Office of the European Union (2025) *Report on the outcomes and transformational potential of the European Universities initiative*. Available at: https://op.europa.eu/en/publication-detail/-/publication/db43f6ca-da14-11ef-be2a-01aa75ed71a1/language-en [Accessed 14 October 2025].
[8] European Commission (2021), *European Universities Initiative factsheet – Aurora*. [online] Available at: https://education.ec.europa.eu/sites/default/files/document-library-docs/european-universities-factsheet-aurora.pdf [Accessed 14 October 2025].

2.2 Study Aims

This study was commissioned by Aurora to identify:

- the collective **economic contribution** of its nine members; and
- the **added value created** through the existence of the Aurora network – indicating the additionality of impacts generated from collaboration.

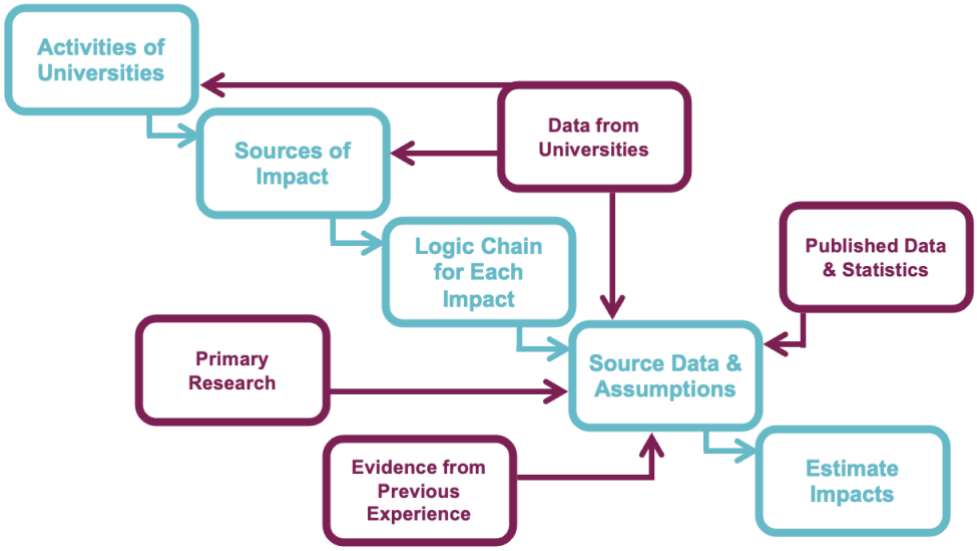
This report will demonstrate to the European Commission and other stakeholders the scale of Aurora's contribution, as measured by the aggregate power of its members and the return on investment. It also indicates how this impact has scope to increase in the future.

2.3 Methodology and Scope

2.3.1 Methodology

The study estimates the total economic contribution made by Aurora. The approach taken was to capture all sources of activity that lead to economic output from Aurora members, representing the additional economic value that arises solely as a result of their existence. The collective total represents the aggregate power generated by Aurora members across Europe. This methodology has been used in more than 100 university economic impact studies produced by BiGGAR Economics[9] and is illustrated in Figure 2-2.

Figure 2-2: Study Approach



Source: BiGGAR Economics.

The starting point for the analysis was to consider the various activities undertaken by Aurora members and to identify those that generate an economic contribution.

[9] This includes studies for: Udice Universities, CURIF, the League of European Research Universities (AURORA), VLIR (Flemish Universities), the Russell Group in the UK, Universities Scotland, Universities Finland, Universities Estonia and ETH Domain in Switzerland.

Logic chains were then developed to describe how each type of activity generates economic value, and used to build an economic model that estimates the economic contribution of Aurora via its members. In this way, it was concluded that Aurora's economic contribution arises from:

- **learning**: associated with educating future, and current, professionals;
- **valorisation**: including contributions from licensing, spin-outs and start-ups, services to businesses and companies based at science park and incubators;
- **operations**: generated from direct activity and employment, spending on goods and services and supporting tourism activity from events and visits to staff and students; and
- **students**: who support economic activity from their daily spending, part-time employment, and volunteering during term time.

The next step was to consider how the value generated by each type of activity might be measured and what data would be required to do this. For most activities, two types of information are required: source information about the scale of the activity and data that could be used as the basis for assumptions to measure the economic value it generates. Where possible, data was obtained directly from each member of Aurora.

The data required for additional assumptions required for the economic model was obtained either from published reports, official statistical sources, or based on BiGGAR Economics' previous experience within the higher education sector. The key statistical source used was the Domestic and Import Input-Output Tables for the relevant countries, 2019 editions published by the OECD. The 2019 data was used, despite the availability of 2020 data, as the latter was considered unrepresentative due to the economic disruptions caused by the Covid-19 pandemic. The sources used are referenced throughout the report and described in more detail in the methodology section Appendix A: Methodology.

Combining the aforementioned sources, it was possible to populate an economic model that estimates the value of each source of contribution from Aurora. The analysis provided in this report provides an aggregated total that accounts for the total contribution of Aurora members collectively.

2.3.2 Measurement

The aggregate economic contribution generated by Aurora members is expressed using two widely accepted measures of economic contribution:

- **Gross Value Added (GVA)**[10]: a measure of economic output, expressed in Euros (€)[11]; and
- **Employment:** expressed in terms of jobs supported by activities.

[10] This report uses the production approach to measuring the GVA contribution, where GVA is equal to the value of the service produced less the value of the inputs used. Typically, this is estimated by subtracting the non-labour (goods and services) costs of the organisation from the organisation's total income.
[11] Euros have been used to provide an overall impact total for the European economy – for those members whose local currency is not euros, this has been converted into Euros using relevant exchange rates.

GVA impacts are reported to nearest whole €million, or €billion, depending on the appropriate scale for each source of impact, and jobs have been rounded to the nearest 100. In the executive summary, this has been rounded to the nearest 1,000 jobs.

2.3.3 Reference Year and Geography

The analysis in this report measures Aurora's contribution in **2024**. Each impact presented in the report should be read as the annual impact, the only exception of which is the graduate productivity, which reflects the lifetime earnings premium for the annual cohort of graduates.

This study considers the contribution of Aurora at the level of the **European economy (Europe).** Given the location of each of the members of the network, this is **defined as the geographic location of the European Economic Area** (i.e. inclusive of the economy of Iceland).

2.4 Report Structure

The remainder of this report is structured as follows:

- **section 3** outlines the link between **universities and economic growth**;
- **section 4** describes the contribution to the economy from **learning** effects, including the additional earnings premium realised by graduates, and the professional education delivered to workers throughout their careers;
- **section 5** describes **valorisation** contributions created through research and knowledge exchange activity, licensing activity, spin-outs and start-up companies of Aurora members, and on-site science parks and incubators;
- **section 6** presents the contribution made by the daily **operations** created by Aurora members - which reflects their role as employers, purchasers of goods and services, and investments in capital projects, such as buildings and facilities;
- **section 7** outlines the contribution generated by **students** studying at Aurora members, including day-to-day spending habits, part-time employment, and volunteering;
- **section 8 summarises the total aggregate power of** Aurora members;
- **section 9** discusses the **value added** by the Aurora network;
- **section 10** presents the **conclusions** of this report; and
- **Appendix A** contains further details of the methodology used.

3. Universities and Economic Growth

Advanced economies have grown alongside the expanding role of universities, which generate the knowledge, skills and innovation needed to sustain economic development.

3.1 Anchor Institutions

Universities are often described as anchor institutions because of the stability and depth they bring to local economies. They are large, permanent, employers that tend to stay rooted in their communities for generations. This makes them different from private firms, which may relocate or downsize as markets change. Universities invest in people, infrastructure and relationships that shape the long-term development of their regions. They also contribute to the attractiveness of a region as a knowledge centre.

The contribution is direct, through jobs, procurement, and student spending, but the largest impact typically arises from the ecosystems that form around them. Research facilities attract innovation firms; cultural projects cluster nearby; and areas with strong university presence often see faster business formation and stronger public services. Across Europe, universities have been shown to be catalysts for wider regeneration and knowledge-based industries, attracting high-tech firms and innovation networks through their research and engagement activities[12].

Universities take on significant leadership roles regionally and nationally, participating in advisory boards across the public, private and voluntary sectors. Academic staff, students, and institutional leaders engage in a variety of community activities, contributing to local governance, skills development and cultural enhancement. This engagement strengthens local decision-making and helps ensure that regional economic development strategies are grounded in robust research and evidence.

University staff and students play a key role in enhancing the cultural and social life of the towns and cities in which they are based. Institutions act as hubs for collaboration, creating links between academics, students and businesses that might not otherwise develop, thereby building conditions that support innovation. Over

[12] European Commission (2017) *Strengthening Innovation in Europe's Regions: Strategies for resilient, inclusive and sustainable growth.* Brussels: European Commission.

time, these relationships form boarder university-centred ecosystems, which subsequently draw in additional talent and investment.

Faced with increasing global competition for talent and inward investment, universities are also international assets for local and national economies. Their research collaborations and global student communities enhance a region's reputation, connect international markets, and attract foreign investment. Universities anchor local economies but also link them to networks of knowledge and growth globally.

3.2 Driving Economic Prosperity

The contribution of universities to economic growth extends beyond their immediate economic footprint. They enable innovation and productivity improvements across industries. Endogenous growth models such as those developed by Aghion and Howitt (1992)[13], place innovation at the centre of economic expansion. In these models, new ideas replace older technologies, improving productivity and living standards. Universities are major contributors to such innovation advancements.

Valero and Van Reenen's[14] macro-level analysis, drawing on UNESCO data covering almost 15,000 universities in 78 countries, indicates a positive relationship between the number of universities in a country and its subsequent growth in Gross Domestic Product (GDP)[15] per capita. Their findings suggest that, on average, doubling the number of universities per capita is linked to a 4% increase in future GDP per capita.

Universities are widely regarded as key sources of human capital; however their overall economic contribution extends far beyond this role. They drive regional innovation, strengthen institutional civic development and act as major economic players through their purchasing activities. Evidence suggests that their influence extends to nearby areas through positive spillover effects.[16]

3.2.1 Human Capital and Skills

At their core, universities create both intellectual and human capital. They produce graduates who are adaptable and equipped to meet the needs of a changing labour market. By strengthening the skills base of the workforce, universities drive productivity and innovation. A more highly skilled workforce also enhances an organisation's capacity to adopt and apply new ideas. Research found that when the share of university-educated workers in a city rises, wages increase for all workers, not just graduates[17]. This happens because knowledge spreads through

[13] Aghion, P. and Howitt, P. (1992) 'A Model of Growth through Creative Destruction', *Econometrica*, 60(2), pp. 323–351.
[14] Valero, A. and Van Reenen, J. (2019) 'The Economic Impact of Universities: Evidence from Across the Globe', *Economics of Education Review*, 68, pp. 53–67.
[15] A measure of economic output. It refers to the market value of all final goods and services produced within a country in a given period.
[16] Ibid.
[17] Moretti, E. (2004) 'Workers' education, spillovers, and productivity: evidence from plant-level production functions', *American Economic Review*, 94(3), pp. 656–690.

collaboration and movement between companies. Regions with high levels of education become more innovative and adaptable as companies are better able to absorb new technologies and methods[18] [19].

Universities also help retain and reskill workers as industries evolve. Professional education has become essential and universities provide short courses, apprenticeships, and professional development that help the workforce keep up with innovation[20].

The positive impact of graduates on productivity throughout their working lives is well established and is reflected in the economic analysis in this report (see Graduate Productivity). The uplift in lifetime earnings associated with a university qualification demonstrates the tangible economic value of higher skills. In turn, this enhanced human capital reflects the long-term prosperity of a nation.

3.2.2 Knowledge Transfer and Technological Innovation

University-led research plays a vital role in advancing innovation. It supports productivity gains, encourages entrepreneurial activity, and generates knowledge spillovers that benefit the wider economy[21]. Research shows that university research boosts industrial innovation. Jaffe (1989)[22] found that firms located near universities are more likely to produce patents and introduce new technologies. The closer the firm is to the source of academic research, the greater the innovation spillovers. This indicates that universities contribute to knowledge creation but also to spreading this within local industrial ecosystems.

Universities are an essential driver of technological innovation, particularly through commercialisation routes such as spin-out enterprises and the licensing of intellectual property. Evidence shows that higher levels of patent activity are linked to stronger economic growth[23] and retaining ownership of patents locally helps ensure that the associated economic benefits remain within a region or country[24]. Aurora members have a strong track record commercialising their research through licensing agreements. A licence involves transferring specific rights, often relative to the use of a patent, from one party to another. The economic contribution of technology licensing is examined further in section 5 of this report.

[18] Lucas, R. (1988) 'On the mechanics of economic development', *Journal of Monetary Economics*, 22(1), pp. 3–42.
[19] Hanushek, E. and Woessmann, L. (2012) 'Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation', *Journal of Economic Growth*, 17(4), pp. 267–321.
[20] OECD (2019) *OECD Skills Outlook 2019: Thriving in a Digital World*. Paris: OECD Publishing.
[21] Knowledge spillover occurs when information and knowledge that are collected and shared for a particular activity generate additional opportunities for application in other settings. This spillover is a catalyst for the development of new ideas and new applications.
[22] Jaffe, A. (1989) 'Real Effects of Academic Research', *American Economic Review*, 79(5), pp. 957–970.
[23] John Goddard, "Connecting Universities to Regional Growth: A Practical Guide", European Union Regional Policy, 2011
[24] Raghupathi, V, "Innovation at country-level: association between economic development and patents", Journal of Innovation and Entrepreneurship, 2017

Universities also support students and staff to establishing spin-out companies, enabling them to use their intellectual property to form new enterprises that develop into successful businesses and significant employers in their own right. This report examines the measurable economic contributions generated by the number of firms created through the commercialisation of university-based knowledge (see Section 5).

Beyond the direct commercialisation of their research, Aurora members play a crucial role in supporting the growth of new enterprises and improving the efficiency of existing ones through their external partnerships. University expertise is particularly valuable to organisations lacking their own R&D capacity, and to non-commercial bodies. For instance, consultancy services allow businesses to draw on specialist academic knowledge, creating distinctive opportunities for knowledge transfer. Similarly, workforce training delivered by universities for external organisations enhances productivity and boosts innovation. These engagements generate quantifiable economic contributions for Aurora (section 5).

3.3 The Economic Contribution of Aurora

This study has calculated, wherever possible, the outputs and contributions considered above for Aurora through the aggregate power of its members. The study assesses the economic contributions of direct and indirect spending, innovation and knowledge exchange, teaching and student contributions and supporting tourism, as well as the longer-term benefits of creating human capital in terms of graduate productivity. Further detail can be found in Appendix A: Methodology.

4. Learning

Aurora creates learning impacts through the earnings premium realised by its graduates, professional education provision for workers, and supporting student internships.

4.1 Graduate Productivity

Aurora members prepare graduates with a strong background in their disciplines and the ability to work across fields, cultures, and sectors. Their education encourages collaboration, innovation, and engagement with real-world challenges, helping students to apply academic knowledge in ways that create social and economic value. This combination develops individuals who are both experts in their field and able to integrate knowledge and work effectively with others.

This approach is built around Aurora's four strategic priorities[25] and shapes adaptable and collaborative professionals with qualities highly valued in the labour market, giving Aurora members' graduates a distinct graduate productivity.

4.1.1 The Economic Contribution of Graduates

Completing a university degree equips graduates with knowledge and skills that raise their productivity beyond what would otherwise be expected. As is standard in comparable economic studies, the value of higher education is assessed by comparing the outcomes of university graduates with those whose highest qualification is at upper secondary level.

University education creates economic value through the benefits received directly by graduates ('personal graduate productivity') and through the gains realised by employers who see improved performance and profitability as a result of hiring more skilled staff.

'Personal graduate productivity' captures the additional lifetime earnings associated with holding a degree, once the costs of study and the taxes paid on these additional earnings are considered. The aggregate economic contribution of graduates therefore reflects not only these individual benefits but also the tax revenues they generate and the increased profits to employers due to enhanced workforce productivity.

Beyond these direct effects, universities also deliver wider economic and social returns including increased innovation, improved workforce adaptability and stronger

[25] Aurora (2025), *Aurora 2030 Programme*. [online] Available at: https://aurora-universities.eu/about/aurora-2030/ [Accessed 14 October 2025].

regional economies, which extend the benefits of higher education well beyond individual graduates.

As it is not feasible to calculate precisely the contribution that graduates make to the profitability of individual firms or to national productivity, the approach taken in this report focuses on the personal gains graduates have from higher education. Therefore the estimate presented is conservative and likely understates the full economic contribution associated with graduate productivity.

Attending university raises the productivity of graduates once in employment but it also increases their likelihood of being employed in the first place. Although this section does not quantify the impact, higher labour market productivity among graduates represents an additional economic benefit.

The graduate productivity captures the long-term contribution to economic activity made by those who graduated from Aurora members in 2024. As such, it should be understood as reflecting the lifetime earnings premium for an annual cohort of graduates (in this case, 2024 graduates of Aurora members).

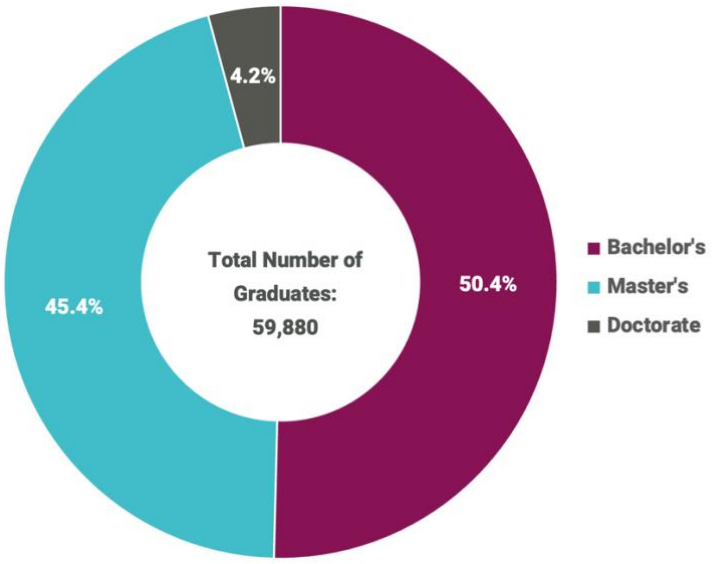
4.1.2 Estimating the Graduate Productivity of Aurora's Graduates

To estimate the graduate productivity of Aurora members' graduates, it was necessary to gather data on two dimensions:

- the number of graduates by degree type and subject area; and
- the returns to different qualification levels.

Based on data from Aurora members, around 59,880 students graduated from Aurora members in 2024. The majority graduated with Bachelors' degrees, accounting for just over 50% of graduates, whilst Masters' degrees accounted for 45.4% and Doctorates the remaining 4.2% (Figure 4-1).

Figure 4-1: Aurora — Graduates by Degree Type



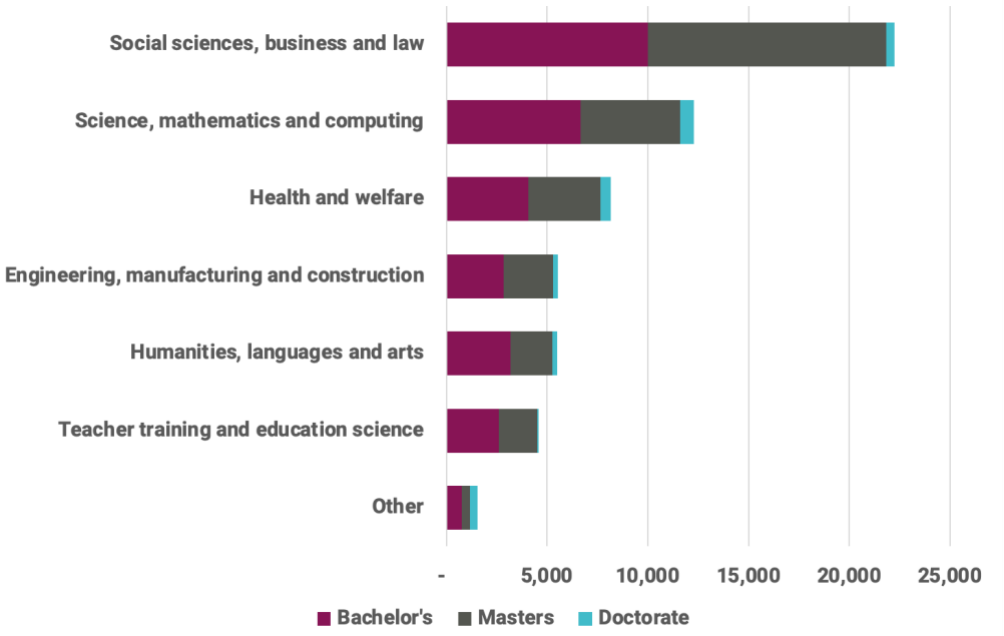
Source: BiGGAR Economics Analysis.

Information on graduate earnings is available from the OECD's Education at a Glance[26] data for 2025 and can be used as a measure of the additional contribution graduates make to the European economy, taking account of their degree subject.

Based on OECD data, the gross financial returns (gross earning benefits minus income tax and social contributions effects) from tertiary education were estimated for each country. Adjustments were then made to account for the benefits arising from different levels of tertiary education (e.g., bachelor's, master's, or doctoral degrees). As earnings vary across professions, the returns to different degree types were estimated with reference to the mean monthly earnings of tertiary-educated adults, by field of education studied[27]. More details of this breakdown can be found in Appendix A: Methodology.

To estimate the graduate productivity, the number of students achieving each degree (by level) was multiplied by that subject's graduate productivity (by level). The proportions of graduates who leave the relative countries on completion of their studies were then removed from the total.

Figure 4-2: Aurora — Graduates by Subject Area



Source: BiGGAR Economics Analysis.

In this way, it was estimated that the lifetime earnings premium associated with an annual cohort of graduates from the Aurora members contributes €7.3 billion GVA across Europe. This is a productivity gain measured in terms of GVA. It does not have an associated employment contribution as that is represented by the individual graduates generating the productivity gains.

[26] OECD (2025), Education at a Glance 2025.

[27] Source: OECD (2020) Educational Attainment and Labour Market Outcomes by Skills.

Table 4-1: Aurora — Economic Contribution of Graduate Productivity

	Europe
GVA (€ million)	7,325

Source: BiGGAR Economics Analysis

4.2 Professional Education

Professional education is an important strategic objective of Aurora, which recognises the changes required in workplaces as technological innovation continue to alter the economy. There is a growing need for new knowledge and skills across all sectors of the economy in order to adapt to major social and economic issues, such as the energy transition and digitalisation, amongst others. For this reason, there is a growing need for education throughout individuals' careers.

This is reflected in various Aurora's programmes and institutional practices. Through its **"For Society"** focus area, Aurora promotes inclusive education and innovation in teaching and learning opportunities that extend beyond formal degrees[28]. The **Aurora Competence Framework**[29] further embeds professional education by identifying transferable competences and tools, including **SEISMIC and LOUIS**, that support learners and educators in developing skills throughout their careers. It also introduced **Guidelines for Micro-credentials** to make learning more flexible across institutions, encouraging participation in short courses and reskilling pathways[30]. The **EURIDICE** initiative strengthens this by creating professional development programmes for educators and advancing innovation in digital and professional education[31].

4.2.1 Economic Contribution from Professional Education

In 2024, Aurora members received an income of €16 million from delivering professional education courses. This was the starting point in estimating benefits from professional education.

Businesses and organisations invest in professional education because they expect it to generate positive returns. In the UK, a study for the government considered the impact of Regional Development Agency spending on businesses. One aspect considered was the GVA returns to business development and competitiveness interventions between 2002 and 2007. It found that interventions in science, research and development and innovation infrastructure had achieved a cumulative GVA

[28] Aurora Universities Alliance (2024) *For society.* Available at: https://aurora-universities.eu/group/for-society/ [Accessed 15 October 2025].
[29] Aurora Universities Alliance (2024) *Aurora Competence Framework.* Available at: https://aurora-universities.eu/aurora-competence-framework/ [Accessed 15 October 2025].
[30] Aurora Universities Alliance (2024) *Guidelines for setting up Aurora micro-credentials.* Available at: https://aurora-universities.eu/resource/guidelines-for-setting-up-aurora-micro-credentials/ [Accessed 15 October 2025].
[31] Aurora Universities Alliance (2024) *Kick-off EURIDICE.* Available at: https://aurora-universities.eu/kick-off-euridice/ [Accessed 15 October 2025].

impact equivalent to 340% of the cost of the projects. This increased to 870% when long-term benefits were considered[32].

This means that every €1 spent on professional education would generate €3.40 GVA in direct economic benefit to businesses. Although the source relates to a UK study, the nature of this type of support is considered to be equally relevant to other European countries, therefore it is appropriate to use the same multiplier in this study.

Applying this rate of return to the total income received and taking account of appropriate multipliers[33] to capture the impact of subsequent spending rounds, it is estimated that the professional education delivered by Aurora members contributes €134 million GVA to the European economy and supports 200 jobs. As professional education mainly boosts the productivity of those who take part, the rise in GVA linked to this activity does not automatically lead to more jobs. Employment contributions arise indirectly from the extra output and employment generated by the organisation as a result of increased productivity.

Table 4-2: Aurora — Economic Contribution of Professional Education

	Europe	
	GVA (€ million)	Employment (Jobs)
Professional Education	134	200

Source: BiGGAR Economics Analysis

4.3 Student Internships

Internships offer substantial value not only to students, but also to the organisations that host them and to universities seeking stronger employer engagement. For students, these placements often improve practical skills and overall employability, and, in many cases, offer opportunities for permanent roles after graduation. Host businesses benefit from the additional capacity and innovative perspectives interns bring, while the wider economy gains from the productivity contribution they make during their placement.

In addition, businesses benefit through:

- the contributions interns make to operational tasks, including supporting the introduction of new processes or assisting with various projects;
- early access to potential future employees, which streamlines the recruitment and helps organisations secure emerging talent;

[32] PriceWaterhouseCoopers (2009) *Impact of RDA Spending: Main Report* (March 2009). UK Department for Business, Enterprise and Regulatory Reform, Table 23.

[33] Every expenditure and employment has a multiplier effect throughout the economy. They are a numeric way of describing the secondary impacts that stem from a business, industry, service or organisation. For example, an employment multiplier of 1.8 suggests that for every 10 employees in Organisation A, 8 additional jobs would be created in other supplier industries so that 18 total jobs are supported by Organisation A.

- the fresh perspective interns bring, often prompting businesses to reassess existing practices and adopt changes that may be challenging to achieve internally;
- the new ideas, experiences and skills interns share with existing staff; and
- the strengthened relationships that develop between the host organisations and the academic sector.

The value of an internship depends on several factors including its duration, the skills of the intern, and the nature of the work. In this case, the value has been estimated based on the amount of time the students spend with the business or host organisation. Although the duration varies by university and by course, for this analysis only internships of 12 weeks or longer were considered. Placements lasting less than 12 weeks were assumed to be observational in nature and would not lead to a change in the hosts' capacity to deliver its goods or services.

Over the course of 2024, 15,380 Aurora members' students undertook internships. It is assumed that internship students are less productive than full-time employees because they have less experience and require more supervision. Therefore, they are assumed to contribute one-half of the GVA achieved by an average worker in the same industry. Using these core assumptions and applying appropriate multipliers to capture the indirect contribution, the student internships organised by Aurora members contributed an estimated €236 million GVA to the national economy and supported 3,600 jobs.

4.4 Summary of Learning Contribution

The learning impacts of Aurora members were estimated to **contribute €7.7 billion GVA and 3,800 jobs** across Europe. This includes the lifetime earnings premium received by the annual cohort of graduates, the professional education the Aurora members deliver, and the internships undertaken by students.

Figure 4-3: Aurora – Economic Contribution of Learning

Graduate Productivity	• €7,325 million GVA across Europe
Student Internships	• €236 million GVA; and • 3,600 jobs across Europe
Professional Education	• €134 million GVA; and • 200 jobs across Europe
Total Contribution	• **€7.7 billion GVA; and** • **3,800 jobs across Europe**

Source: BiGGAR Economics Analysis.

5. Valorisation

Valorisation draws the benefits of Aurora's research and teaching expertise into society, fostering economic growth.

Research is a continual source of new knowledge and when this is shared and applied within the society, it becomes a driver of innovation. Aurora places strong emphasis on turning research into real-world value, investing in the people, infrastructure, and initiatives needed to generate meaningful societal impact. For example, VU Amsterdam embedded this in their objectives, saying that:

"Our ambition … is that knowledge transfer is equally valued as core task … we strive for knowledge transfer that involves active engagement with other parties in society".

Source: VU Amsterdam (2025) *Vision on knowledge transfer*

At Aurora, valorisation activities are undertaken by experienced technology transfer teams and dedicated facilities. Research outputs are linked to the economy through a range of mechanisms, such as collaborative projects with private and public sector partners, the creation of spin-out companies, the provision of specialist services to industry, the operation of science parks and incubators, and the licensing of intellectual property. Collectively, these pathways contribute to higher productivity, job creation, and wider societal benefits.

5.1 Licensing

One of the ways in which Aurora members' research can be translated into economic activity is through licensing agreements with industry. This gives companies the legal right to use technology or intellectual property developed at the universities to generate additional sales, reduce costs or otherwise improve productivity. In return, companies pay royalties to the universities. In 2024, Aurora members received €1 million in royalties and 95% of the licence holders are based in Europe.

The relationship between the royalty paid for a technology and the turnover it generates for licensees depends on the details of individual licensing agreements, which can vary considerably. To agree on a licensing deal, negotiators form a view of how much the intellectual property is worth to the prospective licensee. This is often guided by the '25% rule' which is based on an empirical study by the late Robert

Goldscheider, first undertaken in the 1950's and updated in 2002[34]. The study found that royalty rates were typically around 25% of the licensee's profits which represent around 5% of total turnover generated by licensed technology, although this varies across sectors.

By applying these royalty rates, it is possible to estimate the increased turnover the licensed technologies generate. This figure has been converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects. Whilst 5% is the overall average rate applied, different rates were used across the Aurora members.

In this way, it is estimated that Aurora members contribute €26 million GVA and supports 500 jobs across Europe through licensing activities.

Table 5-1: Aurora – Economic Contribution of Licensing

	Europe	
	GVA (€ million)	Employment
Licensing	26	500

Source: BiGGAR Economics Analysis

5.2 Spin-outs and Start-ups

Entrepreneurship is a strong theme running throughout Aurora. Entrepreneurship education and research ensures that thinking and acting as an entrepreneur is supported through modules and courses, as well as through research activity.

Additionally, Aurora members support students and staff to establish start-up and spin-out companies. In 2024, there were an estimated 240 spin-out and start-up companies originating from the Aurora members, collectively employing around 900 staff. This employment figure is an estimate derived from data supplied by the Aurora members, supplemented by an independent review of individual companies.

All spin-out and start-up companies created in 2024 or earlier that continue to be active in 2024 have been included. This is because companies created prior to 2024 (regardless of how long ago they were created) are still generating turnover and employing staff in 2024. However, only those companies for which employment data was provided or could be sourced were included in the analysis. This figure is therefore likely to underestimate the extent of Aurora members' spin-out and start-up activity.

The total GVA and employment contribution spin-outs and start-ups create reflects their own employment and income, plus the contribution of their staff spending and the contribution they generate throughout their supply chains. This is calculated based on appropriate ratios and multipliers for the sectors in which they each operate. By applying these factors, it is estimated that spin-out and start-up

[34] R. Goldscheider et al, Use of the 25 Per Cent Rule in Valuing IP, December 2002

companies associated with Aurora members contribute €196 million GVA and support 2,400 jobs across Europe.

Table 5-2: Aurora – Economic Contribution of Spin-Outs and Start-Ups

	Europe	
	GVA (€ million)	Employment
Spin-Outs and Start-Ups	196	2,400

Source: BiGGAR Economics Analysis.

5.3 Services to Businesses

Aurora members facilitate knowledge transfer through their interactions with businesses. This can take different forms across member institutions but broadly includes consultancy work for businesses or public organisations, commissioned research[35] and access to specialist facilities and equipment at the universities.

Businesses and public organisations expect this type of investment to generate positive returns, either by increasing staff productivity, developing new products, services and processes, or improving existing products, services and processes. Often it can take several years to produce tangible results from academic engagement. For example, in 2012, Danish consultancy DAMVAD[36] conducted a study on the economic impact realised by companies collaborating with the University of Copenhagen and the results showed that impacts are realised gradually. Six years after the collaboration, companies which had engaged with the University on research and development projects were 15.8% more productive than those which had not.

The value organisations gain from research collaborations vary between projects based on the type of work done, the stage in the development process the project relates to, and the capacity of companies or organisations to absorb the results from the collaboration. Since detailed information on the returns achieved for individual projects is not available, it has been necessary to estimate what the value would be to a company or organisation based on typical returns from this type of academic interaction.

The 340% assumption used in section 4.2.1 for calculating the impact on businesses turnover from investing in professional education can equally be applied in this case since research and consultancy interactions with Aurora members are similar in

[35] Commissioned research refers to any income to the Aurora members from work commissioned by third parties, including work commissioned by companies and other non-profit organisations. This is likely to take a collaborative form though the exact nature of this activity will differ from one member to another.
[36] DAMVAD (2012), Measuring the Economic Effects of Companies Collaborating with the University of Copenhagen.

nature to those measured by the PWC study[37]. This is a cautious approach and may well underestimate the real impact of these interactions.

During 2024, services to businesses generated an income of €79 million for Aurora members. Not all Aurora members provide each of the services described above and therefore only income from the services they do provide has been included in the analysis. This has been converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects.

In this way, it is estimated that Aurora members generate €701 million GVA and supports 1,300 jobs across Europe by providing services to businesses.

Table 5-3: Aurora – Economic Contribution of Services to Businesses

	Europe	
	GVA (€ million)	Employment
Services to Businesses	701	1,300

Source: BiGGAR Economics Analysis

5.4 Science Parks and Incubators

Aurora members support a range of businesses located at science parks and incubators. Together, they provide a significant economic asset for the European economy.

An important part of the success of science parks and incubators is due to the academic partners involved. Without them, they would simply be a collection of businesses with little incentive or stimulus to collaborate. Science parks generate economic benefits by increasing the level of economic activity as well as attracting more companies to the area. For these reasons, it is appropriate to include their value in this assessment.

Unlike spin-out companies, most of the businesses would still exist in some form even if the science parks did not. It would therefore not be appropriate to attribute all the economic activity of businesses based at member science parks to the respective university. If the science parks did not exist, some of the businesses may have chosen to locate elsewhere in Europe or outwith. However, it is likely that co-location with universities has enabled many of these businesses to achieve higher levels of growth than would otherwise have been possible.

In assessing the economic contribution of science parks and incubators, it was necessary to consider both of these factors and come to a view about the extent to which this activity is additional. Further detail about the approach is provided in Appendix A: Methodology. Having accounted for the additionality of this activity, there were an estimated 1,930 employees based across the science parks and

[37] PriceWaterhouseCoopers (PWC), Impact of RDA spending – National report – Volume 1 – Main Report, March 2009, DBERR

incubators associated with Aurora members, that have not been considered elsewhere in this report. This employment figure is an estimate derived from data supplied by the Aurora members, supplemented by an independent review of individual science parks and incubators.

The total GVA and employment contribution they create reflects their own employment and income, plus the contribution of their staff spending and the contribution they generate throughout their supply chains. This is calculated based on the appropriate economic ratios and multipliers for the sectors they operate in. By applying these factors, it is estimated that the involvement of Aurora members in science parks and incubators contributes €181 million GVA and supports 2,100 jobs across Europe.

Table 5-4: Aurora – Economic Contribution of Science Parks and Incubators

	Europe	
	GVA (€ million)	Employment
Science Parks and Incubators	181	2,100

Source: BiGGAR Economics Analysis

5.5 Summary of Valorisation Contribution

Taken together, Aurora members collectively contribute **€1.1 billion GVA and support 6,200 jobs across Europe** from valorisation activity. This is likely to underestimate the total value generated as it is based on the financial returns to members and therefore does not capture the non-monetary generating opportunities pursued by Aurora members to see their intellectual property reach the market. Furthermore, the impacts of valorisation activities that Aurora generates as part of the network's mission to address societal challenges is not incorporated in the assessment and is likely to generate additional value.

Figure 5-1: Aurora – Summary of Valorisation Contribution

Licensing	• €26 million GVA; and • 500 jobs across Europe
Spin-Outs & Start-Ups	• €196 million GVA; and • 2,400 jobs across Europe
Services to Businesses	• €701 million GVA; and • 1,300 jobs across Europe
Science Parks & Incubators	• €181 million GVA; and • 2,100 jobs across Europe
Total Contribution	• **€1.1 billion GVA; and** • **6,200 jobs across Europe**

Source: BiGGAR Economics Analysis

6. Operations

As a large employer with an extensive supply chain and staff complement, Aurora has a sizeable economic footprint across Europe.

6.1 Core

Aurora generates economic activity through its members':

- **direct activity**: the income they receive and the staff they employ;
- **supply chain**: through expenditure on goods and services;
- **staff spending**: from salaries being spent in the economy; and
- **capital expenditure**: from investment in capital infrastructure.

6.1.1 Direct Activity

The direct contribution made by an organisation is the value it adds through its own operations. This report uses the production approach to measuring the GVA contribution, where GVA is equal to the value of the service produced less the value of the inputs used. In the case of Aurora members, this has been estimated by subtracting its non-staff costs (goods and services) from total income.

In 2024, the Aurora members collectively generated an income of €3.8 billion. Over the same period, they spent €901 million on goods and services. Aurora members therefore collectively contribute a direct contribution of €2.9 billion GVA and 33,970 jobs for the European economy.

6.1.2 Supply Chain

Universities are large and complex organisations, with significant expenditure required on goods and services to enable their activities to occur. With nine geographically dispersed members, Aurora supports an extensive supply chain network across Europe. This supports the wider economy by increasing turnover and supporting employment within supplier organisations.

Over the course of 2024, the Aurora members spent around €901 million on goods and services. This expenditure excludes any spending on capital investments, which is estimated separately in section 6.1.4. Based on data provided by Aurora members, an estimated 99% of supply chain expenditure went to suppliers located in Europe. This has been converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects.

6.1.3 Staff Spending

Staff who work for Aurora members contribute to the wider economy by spending their wages and salaries in the areas in which they live.

It is estimated that the 33,970 staff employed in 2024 received around €2.0 billion in salaries and wages. 100% of staff live in Europe.

This was converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects for each of the relevant countries.

6.1.4 Capital Expenditure

Capital expenditure represents investments that typically align with an organisations' long-term strategic objectives, enabling growth and enhanced productivity. This can include investment in facilities such as new buildings or equipment, primarily benefiting construction and manufacturing sectors.

It is estimated that, on average, Aurora members invest around €29 million each year on capital projects, including buildings, machinery and IT infrastructure. This expenditure is in addition to the supply chain expenditure of Aurora members, discussed in section 6.1.2. Based on data provided by Aurora members, it was estimated that 99% of capital spending benefiting businesses in Europe. This has been converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects.

In this way, the capital expenditure of Aurora members is estimated to contribute €285 million GVA and support 3,800 jobs across Europe.

6.1.5 Summary of Core Contribution

Summing the economic contribution generated by each core activity, it is estimated that Aurora members collectively contribute **€6.1 billion GVA and 65,200 jobs across Europe**. A summary of annual contribution by source is provided in Table 6-1.

Table 6-1: Aurora Members – Summary of Core Contribution

	Europe	
	GVA (€ million)	Employment
Direct Activity	2,945	34,000
Supply Chain	903	13,400
Staff Spending	2,005	14,100
Capital Expenditure	285	3,800
Total	**6,140**	**65,200**

Source: BiGGAR Economics Analysis. NOTE: Figures may not sum due to rounding.

6.2 Tourism

6.2.1 Conferences and Events

Conferences, events, and graduations hosted by Aurora members generate short-term economic benefits by drawing visitors to the area. This visitor expenditure is additional to the area, generating economic activity that would not otherwise have

occurred. It is estimated that around 34,040 visitors attended conferences and events organised by Aurora members in 2024.

6.2.2 Visits to Staff and Students

Friends and relatives who visit staff and students at the universities make an economic contribution by going to areas they would not normally have visited. In this sense, their expenditure is additional to the area and would not have happened without the universities.

6.2.3 Summary Tourism Contribution

The aggregate economic contribution associated with tourism-related activities stimulated by Aurora members supports €97 million GVA and 1,600 jobs across Europe.

6.3 Summary of Operational Contribution

The aggregate economic contribution from the operations of Aurora members is summarised in Figure 6-1. It is estimated that this activity **contributes €6.2 billion GVA and support 66,800 jobs across Europe**.

Figure 6-1: Aurora – Economic Contribution of Operations

Core	• €6.1 billion GVA; and • 65,200 jobs across Europe
Tourism	• €97 million GVA; and • 1,600 jobs across Europe
Total Contribution	• **€6.2 billion GVA; and** • **66,800 jobs across Europe**

7. Students

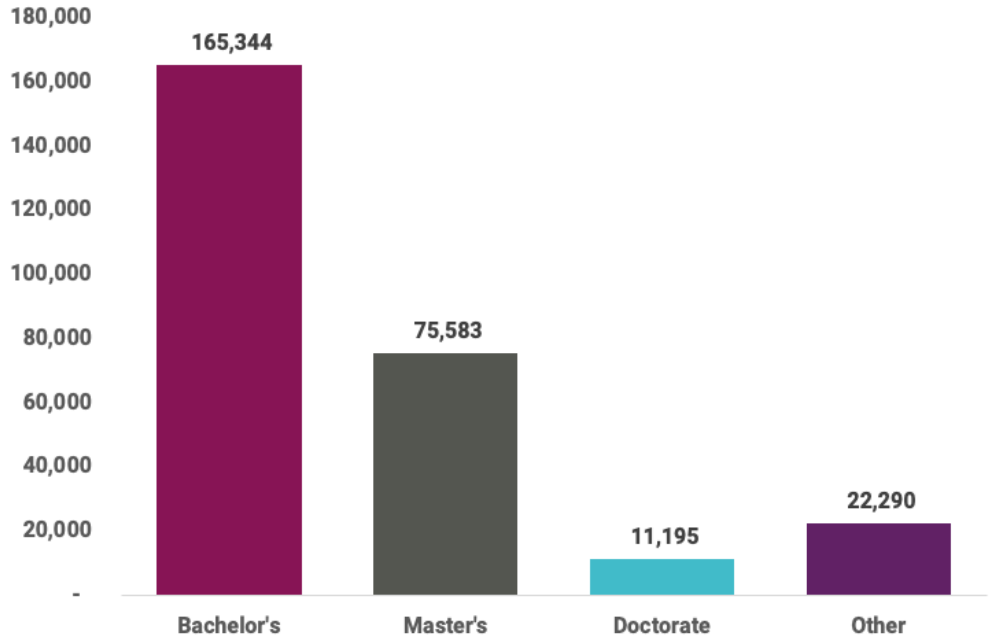
This section discusses the economic activity generated by the day-to-day spending and part-time employment of Aurora members' students.

The focus of the analysis in this section is on full-time students, as the spending patterns and labour market contribution of part-time students is mostly driven by their work rather than their study.

7.1 Student Population

In 2024, there were 274,410 full-time students enrolled at Aurora members. The breakdown of students by course type is shown in Figure 7-1. The category 'Other' includes teacher education and single-cycle Masters' degrees in medicine, dentistry, veterinary medicine, pharmacy and law with a duration of 5-6 years.

Figure 7-1: Aurora – Student Numbers by Degree Type



Source: BiGGAR Economics Analysis

7.2 Student Spending

The value of student spending is estimated based on:

- **where students live**: using an average figure for country-level data produced by Eurostudent[38] for each Aurora member, it was estimated that around 55% of

[38] Eurostudent (2025), Students' housing situation.

students live in rented accommodation, 30% at their family home, and 16% at accommodation owned by Aurora members; and

- **spending patterns**: estimated based on data produced by Eurostudent[39], outlined in Table 7-1.

Table 7-1: Monthly Student Expenditure (€)

	Living with Parents (€)	Not Living with Parents (€)
Accommodation	331	561
Food	201	275
Transportation	83	79
Communication	28	35
Health	43	48
Childcare	2	19
Debt Payment	13	31
Social/Leisure Activities	81	87
Other Living Costs	93	100
Total	**874**	**1,236**

Source: Eurostudent (2025), Students' Expenses. (Average across Iceland, Netherlands, Denmark, Czech Republic, Germany, Spain, Austria, and France).

The annual student expenditure for all full-time students at Aurora members has been converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects. In this way, it is estimated that student expenditure supports €2.8 billion GVA and 30,200 jobs across Europe.

7.3 Student Part-Time Employment

Students contribute to the economy by working part-time to support their studies. Often these jobs are in the hospitality and retail sectors, providing the additional labour some businesses require to support their economic activity. Some Aurora members provided estimates of the proportion of their students who worked part-time. Where no estimate was provided, data from Eurostudent was used.[40] On average across Aurora, it was estimated that 43% of students were working part-time.

Not all these jobs will be additional as some may displace employment from non-students, and the rate of additionality has been adjusted according to the prevailing rate of youth unemployment in each area[41].

[39] Eurostudent (2025), Students' Expenses.
[40] Eurostudent (2024), Students' employment and internships.
[41] Eurostat (2025), Unemployment rates by sex, age and citizenship.

GVA and employment contributions were estimated by applying appropriate economic ratios and calculating multiplier effects. It is estimated that Aurora members students' part-time work supports €3.2 billion GVA and 58,100 jobs across Europe.

7.4 Student Volunteering

Students contribute to the output of voluntary organisations by providing their time and skills for free, enabling charities and other third sector organisations to undertake activities they might not otherwise be able to do.

Based on data provided by Aurora members, and an average for Europe where this was not available, it was estimated that 21% of students take part in volunteering. Each student spends, on average, about 82 hours annually volunteering. It was assumed that students volunteered in the areas where they lived.

This has been converted into GVA and employment contributions by applying appropriate economic ratios and calculating multiplier effects. It is estimated that student volunteering supports €34 million GVA across Europe.

7.5 Summary of Student Contribution

Students based at Aurora members are estimated to **contribute €6.0 billion GVA and support 88,300 jobs across Europe**.

Figure 7-2: Aurora – Economic Contribution of Students

Student Spending	• €2.8 billion GVA; and • 30,200 jobs across Europe
Student Part-Time Employment	• €3.2 billion GVA; and • 58,100 jobs across Europe
Student Volunteering	• €34 million GVA across Europe
Total Contribution	• **€6.0 billion GVA; and** • **88,300 jobs across Europe**

8. Summary of Economic Contribution

Collectively, Aurora members generate an economic contribution worth €21.1 billion GVA to the European economy, supporting 165,200 jobs.

For every €1 received in income, Aurora members generates €5.5 GVA for the European economy. Every direct job supported by Aurora members supports a further 5 jobs in the European economy.

A breakdown of the total contribution made to the European economy is provided in Table 8-1.

Table 8-1: Total Economic Contribution of Aurora

	Europe	
	GVA (€ million)	Employment
Learning	**7,695**	**3,800**
Graduate Productivity	7,325	-
Professional Education	134	200
Student Internships	236	3,600
Valorisation	**1,103**	**6,300**
Licensing	26	500
Spin-Outs & Start-Ups	196	2,400
Services to Businesses	701	1,300
Science parks and Incubators	181	2,100
Operations	**6,233**	**66,800**
Core	6,137	65,200
Tourism	97	1,600
Students	**6,039**	**88,300**
Spending	2,795	30,200
Part-time Working	3,211	58,100
Volunteering	34	-
Total Economic Contribution	**21,072**	**165,200**

Source: BiGGAR Economics Analysis. Note: Figures may not sum due to rounding.

9. Aurora Network: Value Added

Being part of the Network has the potential to generate positive social and economic benefits for member universities, staff, students, graduates, and wider society.

The purpose of Aurora is to bring together nine research-intensive, European, universities to combine their collective academic expertise and knowledge to drive societal change. Through cross-border collaboration, Aurora seeks to:

- **research and innovate;**
- **educate social entrepreneurs; and**
- **influence societal change**.

Facilitating **joint education**, **student and staff mobility**, and **collaborative research** projects, Aurora seeks to build capacity of its members and develop the human capital of its graduates as they become the workforce of the future. Shared support and best practice across members strive to create a network of universities that achieve social, and economic, outcomes beyond which they could working in isolation.

9.1 Theory of Networks

Network additionality is the joint value created through the formation of a university network that would not occur if each university operated in isolation.

Research in innovation and collaboration shows that university networks can deliver multiple layers of additionality. The resulting benefits arising from the synergies of the network are indicative of its collaborative nature, and the generation of impacts that could not be achieved to the same extent by any member alone.

Networks enable behavioural additionality by creating new partner combinations, cross-discipline exchanges and shared ways of collaboration[42] [43] [44]. These behavioural shifts support deeper learning across institutions and combinations of complementary strengths. In addition, by linking universities, networks help critical mass and prevent fragmentation, which are important for research or teaching themes that require scale, diversity and specialised inputs[45] [46]. For industry and governments, university networks provide access to knowledge and talent pathways which help enhance commercialisation opportunities and knowledge transfer relative to what a single university alone could offer in a specific country[47].

There is also the case of structured mobility of students and staff within a network which boosts skills, collaboration patterns, and institutional development beyond individual exchanges[48]. Furthermore, membership in a recognised alliance works as a reputational and signalling mechanism as it provides visibility, global attractiveness, and national/regional capacity by showing quality and connectivity[49] [50].

9.1.1 The Erasmus+ Case

Erasmus+ is a European Union funded programme that began in 2014, following the original Erasmus Programme that was launched for university students in 1987. The current programme involves a network of over 30 countries and seeks to support human capital development by facilitating the ease of mobility of students and staff across members. By fostering cooperation and inclusion, the programme sought to create a strong identity for members across Europe, creating common strategic objectives for universities in terms of education and training.

Given its longevity, the impacts generated from Erasmus+ have been evaluated several times. A report in 2020 by the European Parliamentary Research Service[51]

[42] Cunningham, P. N. & Gök, A. (2012). *The Impact and Effectiveness of Policies to Support Collaboration for R&D and Innovation*. Manchester Institute of Innovation Research.
[43] OECD (2001). *Innovative networks: Co-operating for innovation and learning in the global economy*. Paris: OECD Publishing. Available at: https://www.oecd.org/en/publications/innovative-networks_9789264195660-en.html
[44] Talab, A.H., Scholten, V. & van Beers, C. (2018) 'The Role of Universities in Inter-organisational Knowledge Collaborations', *Journal of the Knowledge Economy*, 11(2), pp. 458-478.
[45] Norwegian University of Science and Technology (NTNU) (2019) *How Universities Contribute to Innovation: A Literature Review-based Analysis*. Available at: https://www.ntnu.edu/documents/1272711283/1276140112/Rapport_How+universities+contribute+to+innovation_web.pdf
[46] Rossi, F. (2016). "Networked by design: Can policy requirements influence cohesion in collaborative R&D networks?" *Technological Forecasting & Social Change*.
[47] Forfás (2004) *Innovation Networks*. Dublin: Forfás. Available at: https://enterprise.gov.ie/en/publications/publication-files/forf%C3%A1s/innovation-networks.pdf .
[48] Teichler, U. (2015). "Academic Mobility and Migration: What We Know and What We Do Not Know." *European Review*, 23(S1), S6-37.
[49] Amado Mateus, L. & Juarez Acosta, A. (2022). "Reputation in Higher Education: A Systematic Review." *Frontiers in Education*.
[50] Kosztyán, Z.T., Fehérvölgyi, B., Csizmadia, T. & Kerekes, K. (2021) 'Investigating collaborative and mobility networks: reflections on the core missions of universities', *Scientometrics*, 126(4), pp. 3551-3564.
[51] European Parliament (2020). 'Impact of the Erasmus+ Programme.'

identified that the programme creates benefits for the individual (students and staff), institution (university), and system (EU). It concluded that Erasmus+ adds value as it:

- is **cost effective**: based on the grants received per student;
- **reduces the likelihood of graduate unemployment**: Erasmus+ students in Eastern Europe are more than five times less likely to be unemployed than those having not participated in the programme;
- **increases the likelihood, and rate, of graduate employment**: Erasmus+ students often experience shorter transitions from graduation to employment, with 69% finding a job within three months; and
- **increased research budgets for cooperative projects between universities**: meaning universities had more resources to address societal challenges that have economic consequences.

A similar evaluation by the European University Association found that the programme is "highly valuable" [52], providing notable impacts for those involved in terms of the quality of education and contribution made to wider society. The evaluation notes the **mobility and cooperation are the key enablers of added value,** aiding institutions to grow and internationalise their student base. Additionally, it identified that being part of the recognised programme also helped institutions to collaborate with non-university partners.

9.2 Expected Benefits: EUI and Aurora Hypothesis

Aurora was established under the EUI, which aims to create alliances that connect education, research, and innovation, promoting change across European universities. Ma and Wihstutz (2024)[53] indicate that the EUI has created a new institutional space in which universities build shared identities, norms and governance cultures. They highlight that such networks contribute not only to functional cooperation but also to inclusion and mutual learning, helping universities with diverse profiles to collaborate on equal terms. Their value is partly in how they reshape relationships and reduce status hierarchies, creating more balanced forms of collaboration across European institutions.

Aurora is one of the European Commission's pilot alliances. The Aurora network is already generating tangible benefits that build on the goals of the EUI. Working together helps each member strengthen what it can offer and achieve collectively more than it could alone. Some of the benefits identified include[54]:

[52] European University Association (2025). 'Use and impact of the Erasmus+ programme (2021-27) at higher education institutions. Survey report and recommendations.'
[53] Ma, J., & Wihstutz, A. (2024). The European Universities initiative: between status hierarchies and inclusion. Published on PMC.
[54] Publications Office of the European Union (2025) *Report on the outcomes and transformational potential of the European Universities initiative.* Available at: https://op.europa.eu/en/publication-detail/-/publication/db43f6ca-da14-11ef-be2a-01aa75ed71a1/language-en [Accessed 14 October 2025].

- **Shared learning, mobility and capacity building**: The network allows for the exchange of practices in teaching, research and governance through staff and student mobility. This helps spread innovation in areas such as micro-credentials, course variety and development, digital learning and community engagement, and is likely to be a draw for many students and staff;
- **Common purpose and alignment**: The network creates a shared sense of direction among its members linking strategies around sustainability, inclusion and societal impact, curricula, research priorities, and quality standards. This strengthens coherence across institutions and supports the wider aim of transforming how European universities operate;
- **Efficiency and access to expertise**: Collecting resources and organising joint activities reduces duplicated work and provides access to expertise and infrastructure that would otherwise not be feasible, especially for smaller universities;
- **Visibility and policy influence**: The network has the potential to have a stronger voice in European university and innovation policy, giving members greater visibility for future initiatives;
- **Preparing for innovation and valorisation**: Given the relatively early stage of the network, direct commercial outcomes are limited thus far. However, Aurora is establishing relationships and shared systems and resources that make future collaboration on research and knowledge transfer possible.

Going beyond shared learning, expertise and efficiency, the Aurora network is expected to create a **critical mass and competitiveness**. This focuses on scale and combined capability, something only multi-university alliances can generate. This could include creation of large interdisciplinary research teams, shared infrastructure, cross-institutional PhD networks, and could strengthen the competitiveness for major EU funding, support the formation of scientific clusters and enhance the potential for impactful research findings that can tackle societal problems.

By working across different countries and universities, the network also helps its members **diversify their student base, funding sources and partnerships**. This reduces reliance on local conditions and boost resilience against national challenges.

9.3 Monitoring and Maximising Long-Term Value

The impacts of university networks such as Aurora often materialise over extended timeframes. Many of the expected benefits, including critical mass in research, institutional learning, and multidisciplinary collaboration and valorisation, develop gradually as relationships mature. Therefore, monitoring does not focus only on short-term outcomes, but it identifies indicators that signal whether the network is progressing along the pathways that typically generate long-term impacts.

In the early years of the network, the most observable changes relate to activity levels and early outputs, such as the number of joint bids, mobility flows or

collaborative events. These short-term results do not yet constitute impact. Instead, they set the foundation for longer-term transformation.

Data provided by Aurora members noted that, by 2024, at least four members had received additional income from either their local or national government specifically for Aurora activities. Additionally:

- at least 34 collaborative research projects were being undertaken;
- over 500 members of staff were mobile across member universities;
- almost 700 students across the member universities were on exchange from another member of Aurora; and
- over 30 Aurora events were held across the network.

Major impacts such as research excellence, critical mass, valorisation, and societal contribution often rely on cumulative processes such as relationships formation, learning between institutions, capability building and the gradual development of trust and shared practices and strengths. For this reason, the magnitude of the impacts of the network in early years of the Alliance, including the 2024 impact, is small compared to its full potential. This should be seen as a lower-bound estimate considering that the marginal benefits are expected to rise disproportionately, consistent with evidence on network effects and cumulative collaboration gains.

Given the significant time lags in value creation, **a robust monitoring framework** is essential for the network to track its progress along the logic chain and demonstrate long-term value added.

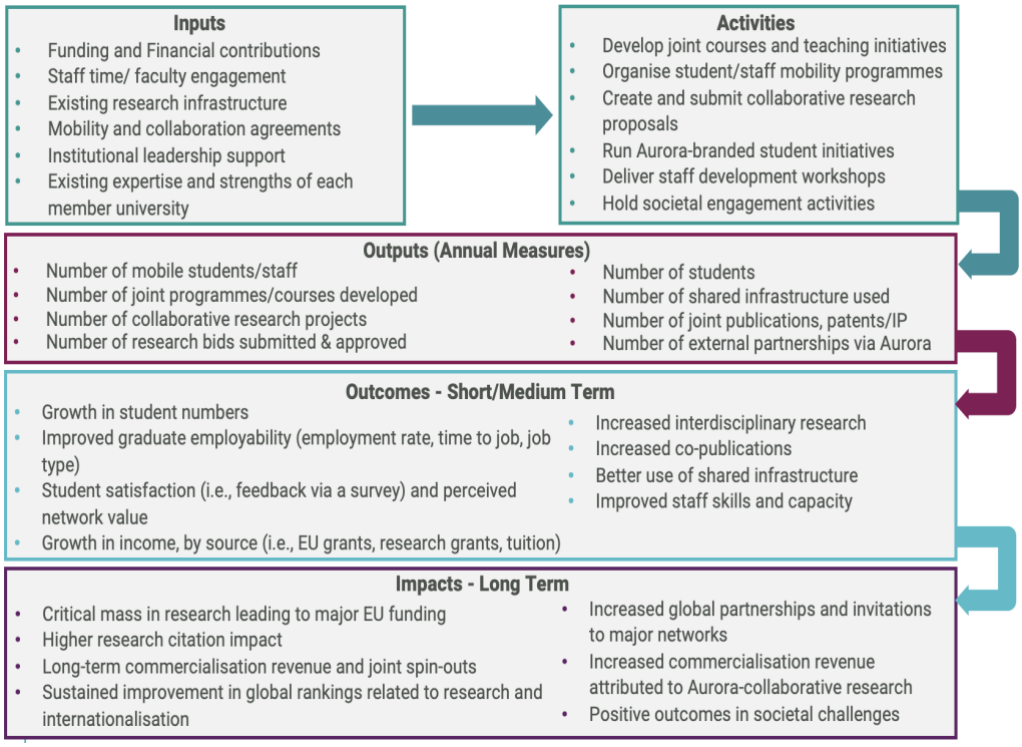
Figure 9-1 presents a set of measures that Aurora can track annually to assess ongoing progress. Although some of the same indicators (for instance, research income, student numbers, commercialisation activity) will eventually be relevant when assessing the network impact, at this stage they primarily serve as short- and medium-term outcome indicators. The shift from 'Outcome' to 'Impact' is not determined by the indicator but by the scale, persistence, and structural significance of the change over time. Figure 9-1 therefore presents 'Impacts' as high-level transformation phases rather than a list of specific metrics. These describe the wider, system-level changes that the network aims to contribute to.

As the monitoring framework focuses on the data that can realistically be collected and interpreted, while also identifying the long-term impact areas that Aurora may expect to see emerge over time, it distinguishes between:

- **Outputs**: the immediate, measurable products of Aurora's Network activities;
- **Outcomes**: the short- and medium-term changes that can be observed within a relatively short period of time (e.g. 1-5 years); and
- **Impacts**: the long-term transformation areas expected to materialise over a longer period of time (e.g. 5-15 years).

This approach ensures that Aurora can monitor early signs of progress today, without expecting measurable impacts that take longer to develop.

Figure 9-1: Aurora Network – Monitoring Framework



Source: BiGGAR Economics Analysis.

Gathering such data on an annual basis will provide a good foundation for future evaluations focussing specifically on the value added of the Aurora network and illustrating the additional benefits it supports.

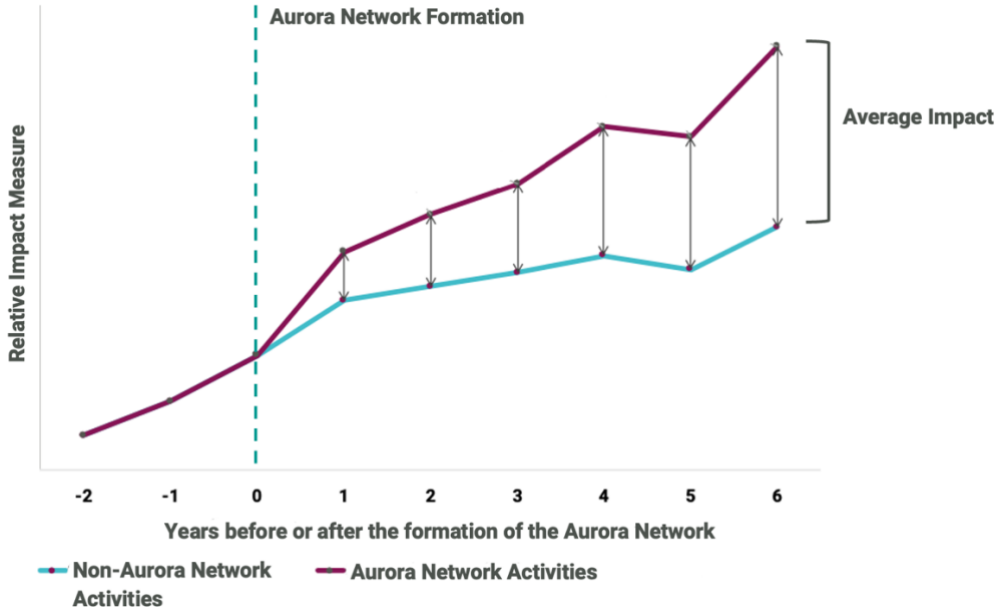
A useful reference for how long-term impacts can be assessed is the work undertaken by DAMVAD for the University of Copenhagen[55] (see section 5). This illustrates a timeline of how impacts from collaboration can be expected to occur over time. Although Aurora does not yet have equivalent long-term data as that used in the study, the same type of analysis becomes possible once the monitoring framework has been in place for several years. With systematically collected indicators on collaboration, research income, graduate outcomes, commercialisation and societal engagement, it will be possible to construct 'before and after' analyses that show the accumulated impact of the network.

Figure 9-2 provides an illustrative example of how the Aurora network can therefore see impacts from its collaborative nature occur over time.[56]

[55] DAMVAD (2012), Measuring the Economic Effects of Companies Collaborating with the University of Copenhagen.

[56] Note – timescales presented are illustrative and should not be taken as exact

Figure 9-2: Timing of Impacts from the Aurora Network



Source: BiGGAR Economics using DAMVAD (2012) analysis.

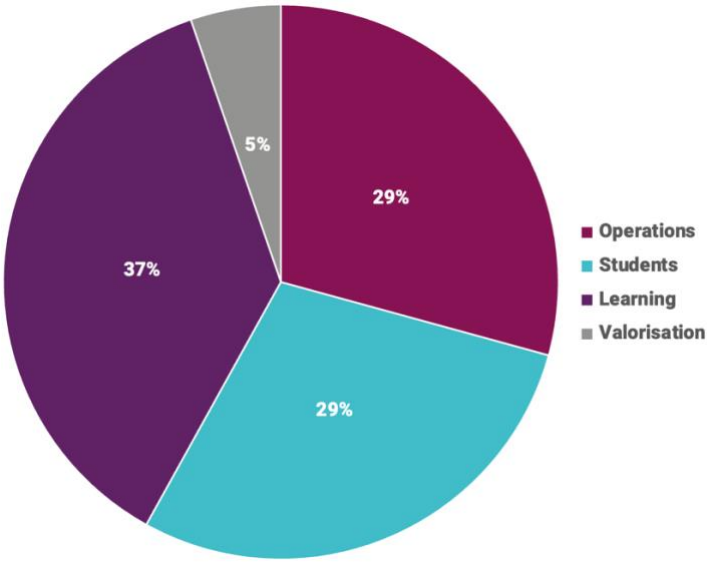
10. Conclusions

Aurora brings together a network of universities across Europe that collectively contribute substantial economic benefits for the European economy.

Having only operated as a collaborative network for around five years, **Aurora brings together institutions that seek to deliver on common societal goals**. It's members are innovators in education and research, producing rounded professionals that seek to deliver such goals both now and in the future. This report demonstrates the scale of economic activity that is collectively contributed to the European economy by its member institutions and provides early indications of the influence of the network status on economic outcomes.

In 2024, Aurora members are estimated to have supported a total economic contribution worth €21.1 billion GVA to the European economy, supporting 165,200 jobs. The share of this total contribution by source is provided in Figure 10-1.

Figure 10-1: Aurora – Share of GVA Contribution by Source



Source: BiGGAR Economics Analysis

For every €1 of income received, Aurora members contribute a further €5.5 for the European economy. Every direct job supported by Aurora members supports a further 5 jobs in the European economy.

The added value generated from the Aurora network is already showing initial benefits in terms of increased resources, collaboration, and student and staff mobility. Given the network's relatively early stage of operation, such benefits are expected to increase in the future and should be monitored to deliver future evaluations of the network.

11. Appendix A: Methodology

This section sets out the methodology followed to estimate the economic contributions of Aurora, including key sources for the underlying economic assumptions.

11.1 Economic Ratios and Multipliers

11.1.1 Economic Ratios

The analysis considers the ratios between turnover, Gross Value Added (GVA) and employment for industries comprising each of the national economies hosting Aurora members. Turnover per job, GVA per job and turnover per GVA ratios were derived from the Organisation for Economic Cooperation and Development's (OECD)'s Input-Output Tables[57] and Trade in Employment dataset[58]. The assessment focuses on data from 2019 since this is considered the latest year for which data are available and are not affected by the impacts from the Covid-19 pandemic. This is because interactions across industries were affected in 2020 due to lockdowns and across 2021 and 2022 due to the rebound in economic activity, as countries' economies opened.

11.1.2 Economic Multipliers

Within an Input-Output economic analysis, the contribution from indirect and induced impacts is captured by GVA and employment multipliers. There are two types of multipliers. Type 1 (M_1) multipliers only consider the economic contribution in the supply chain, whereas Type 2 (M_2) multipliers also include wider spending by the staff working in an organisation. The multipliers are expressed as the final figure for both GVA and Employment. For example, if there is a M_2 GVA Multiplier of 1.75, then €1.00 of direct GVA (D_{GVA}) would result in €1.75 of total GVA (T_{GVA}) contribution. Therefore, to extract the pure multiplier effect, it is necessary to subtract 1 from the initial figure given as the multiplier.

$$T_{GVA} = \underbrace{D_{GVA}}_{\text{Direct}} + \underbrace{(M_1 - 1) * D_{GVA}}_{\text{Indirect}} + \underbrace{(M_2 - M_1) * D_{GVA}}_{\text{Induced}}$$

[57] OECD (2025), Input-Output Tables. Available at: https://www.oecd.org/en/data/datasets/input-output-tables.html

[58] OECD (2024), Trade in Employment (TiM) 2023 edition. Available at: https://data-explorer.oecd.org/vis?lc=en&tm=Trade%20in%20employment&pg=0&snb=163&df%5Bds%5D=dsDisseminateFinalDMZ&df%5Bid%5D=DSD_TIM_2023%40DF_TIM_2023&df%5Bag%5D=OECD.STI.PIE&df%5Bvs%5D=1.0&dq=FFD_DEM..._T.W.PT_EMP.A&pd=2015%2C&to%5BTIME_PERIOD%5D=false

The economic multipliers were estimated based on the Input Output Tables for each of the relevant countries (Italy, France, Germany, the Netherlands, Austria, the Czech Republic, Iceland, Denmark and Spain), which were sourced from the OECD[59]. The multipliers that were estimated using the Input Output Tables were Leontief Type 1 GVA and employment multipliers and Leontief Type 2 GVA and employment multipliers. Type 2 multipliers consider the contribution of supply chain and staff expenditure, whereas Type 1 multipliers only consider supply chain expenditure.

In the analysis, indirect and induced contributions were considered separately. While this is no different from applying Type 2 multipliers, this was necessary to provide accurate estimates in those cases where double-counting could have arisen through the inclusion of both indirect and induced contributions.

11.2 Learning Contributions

11.2.1 Graduate Productivity

The economic contribution from graduates' productivity is one of the most important benefits from the activities of universities. This arises as university education and training will increase the human capital of graduates and result in more productive workers than would have been the case without a university education.

To capture this contribution, the analysis considers the net lifetime earnings that a graduate can expect to reap during their working life. In doing so, it accounts for differences in the returns of different degrees (bachelor's, master's and doctorate) and across subjects studied.

The starting point is to estimate the net earnings of a graduate throughout their lifetime. This is the difference between gross earnings and any income tax and social security contributions. To estimate the earnings premium from a degree compared to someone whose highest qualification is upper secondary education, the returns from an upper secondary education qualification are subtracted from the net earnings from attending higher education. This is the standard approach taken when considering the benefits of university level education.

To account for the fact that earnings arise over a graduate's lifetime, net earnings are then discounted by a factor that considers individuals' preference for present as opposed to future consumption (the OECD data on which this study relies adopt a 3.75% discount rate).

The data source underpinning this analysis was the OECD's "Education at a Glance 2025"[60] and its tables on "private costs and benefits for a man attaining tertiary education" and "private costs and benefits for a woman attaining tertiary education". To estimate graduate lifetime earnings regardless of sex, data for men and women

[59] OECD (2025), Input-Output Tables. Available at: https://www.oecd.org/en/data/datasets/input-output-tables.html

[60] OECD (2025), Education at a Glance 2025. Available at: https://www.oecd.org/en/publications/2025/09/education-at-a-glance-2025_c58fc9ae.html

were averaged. As the OECD estimates the benefits from attending higher education with respect to purchasing power parity (PPP) US$, figures were converted into euros, taking the ratio of GDP per capita (constant Local Currency Units (LCU))[61] and 2024 PPP Dollars[62] for each country hosting an Aurora member. Table 11-1 shows the net earnings from tertiary education across the countries considered in this analysis.

As data for Iceland was not available from the OECD data, lifetime net earnings benefits were estimated by subtracting income tax effects[63] from the gross earnings benefits[64]. Where relevant, values were converted to PPP$ using the PPP conversion factor GDP (LCU per international $)[65].

Table 11-1: NPV Lifetime Net Earnings from Tertiary Education

Country	€
Netherlands	€175,750
Austria	€163,930
Czech Republic	€112,620
Denmark	€120,960
Germany	€166,890
Italy	€91,370
Spain	€118,610
France	€194,010
Iceland	€188,930

Source: World Bank (2025), GDP per Capita (constant LCU); World Bank (2025), GDP per Capita, PPP (current international $); OECD (2025), Education at a Glance 2025.

The average net earnings from tertiary education are then weighted to account for the differences in earnings across different degree levels, namely:

- bachelor's;
- master's; and
- doctorate.

These data were sourced from the OECD[66] and refer to the average relative differences in earnings across these educational levels for full-time workers aged 25-34 years old. Given the specialist nature of a doctorate degree compared to a

[61] World Bank (2025), GDP per Capita (constant LCU).
[62] World Bank (2025), GDP per Capita, PPP (current international $).
[63] Statturinn (2024), Key rates and amounts 2024. Available at: https://www.skatturinn.is/english/individuals/key-rates-and-amounts/2024/#%20
[64] Statistics Iceland (2024), Wages and Income: Total Income by age and sec all education levels ('000s ISK). Available at: https://www.statice.is/statistics/society/wages-and-income/income/
[65] World Bank (2025), PPP conversion Factor GDP (LCU per international $). Available at: https://data.worldbank.org/indicator/PA.NUS.PPP?locations=IS
[66] OECD (2025), Education at a Glance 2025 - Table A4.1. Available at: https://www.oecd.org/en/publications/2025/09/education-at-a-glance-2025_c58fc9ae.html

master's, it was assumed that the labour market returns from the two qualifications would be similar.

The average graduate productivity associated with each qualification is set out in Table 11-2. This captures the benefits associated with each extra level of education achieved. Benefits by qualification were estimated based on the relationship between different tertiary education qualifications and the average returns from tertiary education as a whole.

Table 11-2: Net Lifetime Earnings from an Average Degree

Country	Bachelor	Master's & Doctorate
Netherlands	€115,150	€139,390
Austria	€93,670	€187,350
Czech Republic	€74,010	€64,360
Denmark	€69,210	€140,170
Germany	€157,350	€61,990
Italy	€65,790	€40,200
Spain	€102,800	€76,440
France	€79,370	€224,870
Iceland	€83,920	€286,360

Source: BiGGAR Economics Analysis of OECD (2025) Education at a Glance 2025

The returns from a master's and a doctorate qualification are those attributable to that specific qualification. The returns from a master's degree were based on those of a master's graduate compared to those of a worker whose highest qualification is a bachelor's degree. Therefore, a master's graduate could expect a total lifetime premium on earnings from their university education equivalent to the sum of the returns from a bachelor's and a master's degree. It was then possible to estimate the graduate productivity across different degree types and subjects, where the difference across subjects was captured by considering the difference in median earnings across different professions.

This involved considering the mean monthly earnings of tertiary-educated adults by field of study from Eurostat[67] and applying deviations from average earnings from OECD[68] across the following fields of study:

- Teacher training and education science;
- Humanities, languages and arts;
- Social sciences, business and law;
- Science, mathematics and computing;
- Engineering, manufacturing and construction; and

[67] Eurostat (2025), Mean and median income by educational attainment level. Available at: https://ec.europa.eu/eurostat/databrowser/view/ilc_di08__custom_17918333/default/table

[68] OECD (2020) Educational Attainment and Labour Market Outcomes by Skills.

- Health and welfare.

To estimate total graduate productivity, the total number of graduates in each subject was multiplied by the premium associated to that subject and that educational attainment across the different countries, as shown in Figure 11-1.

Figure 11-1: Formula and Inputs for the Graduate Productivity Contribution

Formulas
$GVA = \sum_d (G_{(d)} * P_{(d)})$
Inputs
$G_{(d)} = Number\ of\ graduates\ with\ degree\ (d)$
$P_{(d)} = Graduate\ Productivity\ for\ graduate\ with\ degree\ (d)$

11.2.2 Professional Education

The Aurora members also educate existing workers through their engagement in professional education. This is done by offering a range of short courses, which benefit participants by furthering their knowledge and skills and, in that way, improve their productivity.

The starting point in estimating the contribution associated with professional education courses was to consider the income that they generated. Based on the information received from Aurora members, it was estimated that through these courses, Aurora members generated around €16 million. Where additional details were available on the type of courses involved, this income was then allocated to the economic sectors associated with those courses.

To estimate the direct GVA generated, the income from professional education was multiplied by 340%. This is based on a study for the Department of Business, Enterprise and Regulatory Reform[69] which considered the GVA returns to business development and competitiveness interventions between 2002 and 2007. The analysis found that interventions in science, R&D and innovation infrastructure had achieved cumulative GVA equivalent to 340% of the cost of the projects and that this could increase to 870% if the long-term benefits were considered. GVA per job ratios were then applied to estimate the direct employment supported by professional education.

Benefits from the interaction of university and businesses take time to realise. In a study on the subject, Danish consultancy DAMVAD[70] found that it requires around six years for productivity impacts from business-university interaction to be realised. On

[69] PriceWaterhouseCoopers (2009), Impact of RDA spending – National report – Volume 1 – Main Report, DBERR.
[70] DAMVAD (2012), Measuring the Economic Effects of Companies Collaborating with the University of Copenhagen.

this basis, since this study covers one year worth of economic activity, total employment impacts were divided by 6.

In addition to the direct contribution generated by the delivery of professional education courses, it was necessary to consider indirect and induced contributions. Indirect contributions refer to the economic effects taking place within an organisation's supply chain. Induced contributions consider the effect of the spending of salaries and wages of those workers employed within the supply chain. These were estimated by applying Type 1 and Type 2 GVA and employment multipliers to the estimates of direct GVA and employment.

It was assumed that all the growth from professional education would be from increased worker productivity, rather than organisational expansion. As a result, the employment contributions are solely associated with the increased activity in the supply chains and from increased induced contributions from higher staff salaries.

Figure 11-2: Formula and Inputs for Professional Education Contribution

Formulas

$$\text{GVA} = M(G)_i^2 * \sum_i 340\% * Income(PE)$$

$$\text{Employment } = (M(E)_i^2 - G(p)) * \sum_i \frac{GVA(PE_i)}{\frac{G_i}{E_i} * 6}$$

Inputs

$$GVA(PE_i) = GVA\ associated\ with\ Professional\ Education\ in\ industry\ (i)$$

$$M(G)_i^2 = \ Type\ 2\ GVA\ Multiplier\ in\ industry\ (i)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$\left(\frac{G_i}{E_i}\right) = The\ \frac{GVA}{Employment}\ ratio\ in\ industry\ (i)$$

$$Income(PE) = Income\ from\ Professional\ Education\ in\ industry\ (i)$$

$$G(p) = Share\ of\ growth\ from\ increased\ worker\ productivity$$

11.2.3 Student Internships

Students also contribute to economic activity when participating in internships within businesses. Their work supports the organisations where they intern and provides students with experience that will increase their future productivity and employability.

The analysis considered only those internships that lasted more than 12 weeks. This is because shorter internships were deemed as being mainly of an observational type and, as a result, interns were not assumed to make an economic contribution to the businesses where they did their placement.

Based on the information provided, it was estimated that across the Aurora members around 15,380 students were involved in internships that lasted longer than 12 weeks. These students spent on average around 19 weeks as part of their internship. To estimate the economic contribution associated with these internships, it was first necessary to establish in which economic sector they took place.

To estimate the number of full-time equivalent jobs (FTEs) supported, the number of weeks spent by students in internships was then divided by the average number of weeks that an employee in that sector would spend in the workplace over a year. This was further discounted by 50%, to account for the fact that interns have a lower productivity than the average worker in each of the sectors considered.

It was then possible to estimate the direct GVA supported through internships by applying the relevant GVA per job ratio for the sectors where students undertook internships. Indirect contributions were further estimated by applying Type 1 GVA and employment multipliers to the direct GVA and employment estimates. Induced contributions were not considered, as the contribution of student spending has already been considered elsewhere in the analysis. Details of the calculations performed are provided in Figure 11-3.

Figure 11-3: Formula and Inputs for Student Internships Contribution

Formulas

$$GVA = \sum_i \frac{G_i}{E_i} * \frac{\sum(Weeks)_i}{52} * 50\% * M(G)_i^1$$

$$Employment = \sum_i * \frac{\sum(Weeks)_i}{52} * 50\% * M(E)_i^1$$

Inputs

$$\frac{G_i}{E_i} = \frac{GVA}{Employment}\ ratio\ in\ industries\ of\ student\ internship$$

$$(Weeks)_i = Number\ of\ weeks\ student\ spends\ at\ internship\ in\ industry\ (i)$$

$$M(G)_i^1 = Type\ 1\ GVA\ Multiplier\ in\ industry\ (i)$$

$$M(E)_i^1 = Type\ 1\ Employment\ Multiplier\ in\ industry\ (i)$$

11.3 Valorisation

11.3.1 Licensing

The Aurora members also contribute to economic activity through their scientific discoveries and technology development, which are then commercialised through licences. Based on the information received, it was estimated that from their licensing activities the Aurora members received just over €1 million.

Across the Aurora members, it was estimated that 95% of the turnover from licences came from businesses located in Europe. The economic contribution from licences is dependent on the sector where the licence holder operates. Income from licensing activity was therefore allocated to an economic sector according to the academic field where the licence was developed.

To estimate the value generated by licensing agreements, it was necessary to form a view over the value of the licence. 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 on a licensing deal, negotiators must first form a view of how much the IP is worth to the prospective licensee. The 25% rule is a general rule of thumb according to which the licensor should receive around one quarter to one third of the profits accruing to the licensee and has been used by IP negotiators for at least 40 years. The rule is based on an empirical study first undertaken in the 1950s and updated in 2002. The study found that royalty rates were typically around 25% of the licensee's profits, which equates to around 5% of sales from products embodying the patented technology. This implies that royalties paid for a technology typically represent around 5% of the total turnover generated by that technology.

In 2002 Goldscheider[71] et al undertook further empirical analysis to test the continued validity of the 25% rule. The analysis was based on more than 1,500 licensing agreements from 15 different sectors between the late 1980s and the year 2000. The study found that although royalty rates ranged between 3.2% in the semi-conductor sector to 8.0% in the media and entertainment sector, on the whole they differed very little from those used in the 1950s. Royalty rates by sector were applied to the income from licensing to estimate the total value generated by the licensing activity carried out by the Aurora members.

Having estimated the value associated with each licensing agreement, this was then divided by the relevant sectoral turnover per GVA and turnover per job ratios to estimate the direct GVA and employment generated by licensing activity. The licensing payment covers one year and therefore the activity is assumed to occur within that time period. Type 1 and Type 2 GVA and employment multipliers were then applied to estimate indirect and induced contributions.

[71] Goldscheider et al, Use of the 25 Per Cent Rule in Valuing IP, December 2002.

Figure 11-4: Formula and Inputs for Licensing Contribution

Formulas

$$Rev(L_i) = \frac{Income\ (L_i)}{Rate_i}$$

$$GVA = \sum_i \frac{Rev\ (L_i)}{(T_i/G_i)} * M(G)_i^2$$

$$Employment = \sum_i \frac{Rev\ (L_i)}{(T_i/E_i)} * M(\mathrm{E})_i^2$$

Inputs

$$M(G)_i^2 = Type\ 2\ GVA\ Multiplier\ in\ industry\ (i)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$Rev(L_i) = Revenue\ generated\ from\ licences\ in\ industry\ (i)$$

$$(T_i/G_i) = The\ \frac{Turnover}{GVA}\ ratio\ in\ industry\ (i)$$

$$\frac{T_i}{E_i} = \frac{Turnover}{Employment}\ ratio\ in\ industry(i)$$

$$Rate_i = Royalty\ rate\ for\ industry(i)$$

$$Income(L_i) = Income\ to\ the\ University\ from\ licences\ in\ industry\ (i)$$

11.3.2 Spin-Outs and Start Ups

The Aurora members also support the creation of new companies which bring to market a specific product, service or technology based on research and expertise developed at their universities. This includes spin-outs and start-ups.

The economic contribution of spin-out and start-up companies was estimated by first considering employment in each company. Employment data for each company was either provided by Aurora members, sourced from company websites or from information available on LinkedIn.

Impacts were attributed based on the location of the spin-outs and start-ups (i.e., inside or outside Europe). It was then possible to estimate direct GVA contributions by applying GVA/employee ratios for the sector in which the company operates to the number of staff employed in each company. Induced and indirect effects were captured by applying sector appropriate multipliers to the direct contributions of each company.

Figure 11-5: Formula and Inputs for Spin-Outs and Start-Ups Contribution

Formulas

$$GVA = \sum_i \frac{G_i}{E_i} * E_i * M(G)_i^2$$

$$Employment = \sum_i E_i * M(E)_i^2$$

Inputs

$$\frac{G_i}{E_i} = \frac{GVA}{Employment}\ ratio\ in\ industries\ of\ spin-outs\ and\ start-ups$$

$$M(G)_i^2 = Type\ 2\ GVA\ Multiplier\ in\ industry\ (i)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$E_i = direct\ employment\ in\ start-ups\ or\ spin-outs$$

11.3.3 Services to Businesses

The Aurora members also make an economic contribution through the services they provide to businesses, including:

- consultancy;
- facilities and equipment hire; and
- commissioned research.

To estimate the direct GVA that was generated through these activities, turnover was multiplied by 340%, in line with what was done when considering the economic contributions from professional education.

The analysis accounted for the fact that some sectors are more likely to engage with academia. Eurostat provides data regarding the level of engagement with academia by sector, which shows that almost 50% of the academic engagement with industry across the countries considered in the analysis involves the manufacturing sector[72]. Based on evidence from Danish consultancy DAMVAD[73], the impacts on employment were assumed to be realised over six years.

[72] Eurostat (2023), Innovative enterprises that co-operated on R&D and other innovation activities with other enterprises or organisations, by kind and location of co-operation partner, NACE Rev.2 activity and size class (2020). Available at: https://ec.europa.eu/eurostat/databrowser/product/page/INN_CIS12_COOP

[73] DAMVAD (2012), Measuring the Economic Effects of Companies Collaborating with the University of Copenhagen.

Furthermore, it was assumed that around 25% of impacts from commissioned research, facilities and equipment hire and consulting activities were linked to increases in productivity, whereas the remainder was associated with increases in the level of employment of the businesses collaborating with the Aurora members.

Figure 11-6: Formula and Inputs for Services to Businesses Contribution

Formulas

$$\text{GVA} = M(G)_i^2 * \sum_i 340\% * Income(SB_i)$$

$$\text{Employment } = (M(E)_i^2 - G(p)) * \sum_i \frac{GVA(SB_i)}{\frac{G_i}{E_i} * 6}$$

Inputs

$$GVA(SB_i) = GVA\ associated\ with\ Services\ to\ Businesses\ in\ industry\ (i)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$M(G)_i^2 = Type\ 2\ GVA\ Multiplier\ in\ industry\ (i)$$

$$\left(\frac{G_i}{E_i}\right) = The\ \frac{GVA}{Employment}\ ratio\ in\ industry\ (i)$$

$$Income(SB_i) = Income\ from\ Services\ to\ Businesses\ in\ industry\ (i)$$

$$G(p) = Share\ of\ growth\ from\ increased\ worker\ productivity$$

11.3.4 Science Parks and Incubators

The Aurora members host businesses in science parks and incubators. To estimate this economic contribution, it was first necessary to collect data on the employment, turnover and economic sector of the businesses operating within them and the extent of university involvement.

It was then necessary to consider how much of the economic activity created by these science parks and incubators would have happened anyway. It is likely that many of the companies would have found other locations elsewhere in the country if the science parks and incubators associated with the Aurora members did not exist. Based on evidence from previous work by BiGGAR Economics across the sector, approximately 33% of the economic activity at university science parks is considered additional to the European economy. Full additionality was assumed for incubators, given their role in supporting hosted companies.

For each science park and incubator, assumptions were also made about the extent to which activity was attributable to Aurora members alone. This was done by considering the number of other partners involved in the science park or incubator and reducing attributability to the Aurora member accordingly. This is because the involvement of other partners indicates the member is not solely responsible for the

science park and its entire contribution cannot therefore be attributed to the member.

Contributions were estimated based on the companies' direct employment, after having excluded any jobs associated with university staff to avoid any double-counting. Any spin-outs located on science parks were excluded here as their contribution has been included in the spin-outs contribution.

Employment was multiplied by sectoral GVA per job to estimate the direct GVA generated. Indirect and induced contributions were estimated following the same approach as in previous sections.

Figure 11-7: Formula and Inputs for Science Park and Incubators Contribution

Formulas

$$GVA = SPA_{(Study\ Area)} * Turnover\ (SP) / (\frac{T_{(i)}}{G_i}) * M(G)_i^2$$

$$Employment = SPA_{(Study\ Area)} * Direct\ Employment\ (SP) * M(E)_i^2$$

Inputs

$$Turnover\ (SP) = Annual\ Turnover\ of\ Incubator/Science\ Park$$

$$Direct\ Employment\ (SP) = Employment\ in\ SP\ excl\ Aurora\ employees\ and\ spin - out\ companies$$

$$\left(\frac{T_{(i)}}{G_i}\right) = The\ \frac{Turnover}{GVA}\ ratio\ of\ the\ industry\ (i)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$M(G)_i^2 = Type\ 2\ GVA\ Multiplier\ in\ industry\ (i)$$

$$SPA_{(Study\ Area)} = Incubator/Science\ Park\ \ additionality\ in\ the\ study\ area$$

11.4 Core

11.4.1 Direct

The direct contribution of an organisation captures its own exclusive contribution to economic activity. This is expressed in terms of its direct Gross Value Added (GVA) and its headcount employment. The direct GVA of an organisation is estimated as the difference between its income and its non-staff operational expenditure.

The Aurora members had a total income of around €3.8 billion and spent a total €0.9 billion in non-staff operational expenditure. Over the same period, the Aurora members supported around 33,970 direct jobs. This excludes any doctorate students

also working for an Aurora member, which have been considered as part of the student contributions.

11.4.2 Expenditure on Supplies

Aurora members also contribute to economic activity through their expenditure on goods and services. This benefits the businesses where money is spent and supports their activities and employment.

It was estimated that the spending on non-staff operational costs of the Aurora members was around €901 million. Based on data received from the members, it was estimated that 99% of this expenditure benefitted businesses in Europe.

To assess the economic contribution generated by this spending, it was first necessary to estimate in which sectors of the economy money were spent. This was based either on data from Aurora members or on previous experience working with universities across Europe. Allocating spending by sector allowed for the use of sector-specific economic ratios and multipliers. The direct GVA and direct employment generated by supply chain spending were estimated by diving sectoral turnover by its respective turnover per GVA and turnover per job ratios. Indirect and induced effects were estimated by applying Type 1 and Type 2 multipliers for the relevant sectors.

The economic contribution made by supply chain spending was estimated in line with the methodology set out in Figure 11-8.

Figure 11-8: Formula and Inputs for Contribution of Expenditure on Supplies

Formulas

$$\text{GVA} = \sum_a Exp_{(a)} \,/\, \frac{T_{i(a)}}{G_{i(a)}} * M(G)_i^2$$

$$\text{Employment} = \sum_a Exp_{(a)} \,/\, \frac{T_{i(a)}}{E_{i(a)}} * M(E)_i^2$$

Inputs

$$Exp_{(a)} = \ Expenditure\ on\ commodity\ (a)$$

$$\frac{T_{i(a)}}{G_{i(a)}} = \frac{Turnover}{GVA}\ ratio\ in\ industry\ associated\ with\ commodity\ (a)$$

$$\frac{T_{i(a)}}{E_{i(a)}} = \frac{Turnover}{Employment}\ ratio\ in\ industry\ associated\ with\ commodity\ (a)$$

$$M(E)_i^2 = \ Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$M(G)_i^2 = \ Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

11.4.3 Staff Spending

The Aurora members also support economic activity through their employees spending their salaries and wages across the economy. It was estimated that Aurora

members spent around €2.0 billion in staff costs (excluding PhD salaries which have been considered separately). These include spending on staff wages, social security contributions, pension contributions and other benefits.

To estimate the economic contribution that is generated by this expenditure it was first necessary to make assumptions on where staff would spend their money. As some money would benefit businesses from outside the relevant countries, there is no exact match between where staff are located and where spending takes place. It was assumed that staff living in each of the countries hosting the Aurora members would spend around 99% of their incomes in Europe and 1% elsewhere in the world.

Having estimated the amount of spending taking place in Europe, it was then possible to allocate this to the sectors benefitting from it. This was based on an analysis of household expenditure (i.e., the sectors in which households spend their incomes) from the OECD's Input-Output Tables.

Prior to estimating the economic contribution generated by this expenditure, it was necessary to discount it by the share of household expenditure devoted to Value Added Tax (VAT), based Eurostat[74] data. The average VAT rate applied to goods and services on which households spend money across the countries considered in the analysis ranges between 6.8% and 9.9%.

Having excluded spending on VAT, it was then possible to estimate the direct GVA and employment supported by staff expenditure by applying the relevant turnover per GVA and turnover per job ratios. Indirect and induced contributions were then estimated based on the relevant Type 1 and Type 2 GVA and employment multipliers. The calculations performed to estimate the economic contribution from staff spending are displayed in Figure 11-9.

[74] Eurostat (2025), Joint Distribution of household income, consumption and wealth - statistics on taxation. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Joint_distribution_of_household_income,_consumption_and_wealth_-_statistics_on_taxation&oldid=628069

Figure 11-9: Formula and Inputs for Calculating Staff Spending Contribution

Formulas

$$\text{GVA} = SE / \frac{T_S}{G_S} * M(G)_S^2$$

$$\text{Employment} = SE / \frac{T_S}{E_S} * M(E)_i^2$$

Inputs

$$\frac{T_S}{G_S} = \frac{Turnover}{GVA}\ ratio\ for\ staff\ spending$$

$$\frac{T_S}{E_S} = \frac{Turnover}{Employment}\ ratio\ for\ staff\ spending$$

$$M(E)_S^2 = Type\ 2\ Employment\ Multiplier\ for\ staff\ spending$$

$$M(G)_S^2 = Type\ 2\ GVA\ Multiplier\ for\ staff\ spending$$

$$SE = Value\ of\ staff\ expenditure\ (less\ VAT)\ spent\ in\ each\ study\ area$$

11.4.4 Capital Spending

The Aurora members also create economic contribution through their spending on capital projects such as the construction of new buildings and equipment.

Capital spending fluctuates from year to year, so an average was taken of the Aurora members' capital spending over ten years (2020 to 2029). On this basis, across the network annual capital spending was estimated at €29 million. Based on the information provided by members, 99% of capital spending went to countries in Europe.

Capital spending was allocated between the construction of buildings and purchases of equipment. It was then possible to estimate the direct GVA and employment supported by capital expenditure by applying the relevant turnover per GVA and turnover per job ratios. Indirect and induced contributions were estimated based on the relevant Type 1 and Type 2 GVA and employment multipliers.

The calculations performed to estimate the economic contribution from capital spending are displayed in Figure 11-10.

Figure 11-10: Formula and Inputs for Calculating Capital Spending Contributions

Formulas

$$\text{GVA} = \text{CS} / \frac{T_C}{G_C} * M(G)_i^2$$

$$\text{Employment} = \text{CS} / \frac{T_C}{E_C} * M(E)_i^2$$

Inputs

$$\frac{T_C}{G_C} = \frac{Turnover}{GVA}\ ratio\ for\ capital\ spending$$

$$\frac{T_C}{E_C} = \frac{Turnover}{Employment}\ ratio\ for\ capital\ spending$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ for\ industry\ (i)$$

$$M(G)_i^2 = Type\ 2\ GVA\ Multiplier\ for\ industry\ (i)$$

$$CS = Value\ of\ capital\ expenditure$$

11.5 Tourism

11.5.1 Visits to Staff and Students

When studying or working at the Aurora members, students and staff receive visits from relatives and friends (VFR visits). These visitors contribute to economic activity by spending money during their trips, supporting the turnover and employment of local businesses.

Based on data from the OECD[75] on international visits and from Eurostat on visits by purpose[76], it was possible to estimate the number of domestic and international VFR visits per head across all of the countries hosting Aurora members. These ratios were then multiplied by the total number of students and staff at each of the Aurora members to estimate the total number of VFR visits taking place over a year.

Total visitor spending was then estimated by multiplying average visitor spending[77] [78] with the total number of VFR trips associated with staff and students at Aurora members. Spending was discounted by each country's prevailing rate of VAT, with economic ratios and multipliers from those sectors recipient of tourism expenditure applied to estimate the total employment and GVA supported by visitor spend.

[75] OECD (2024), OECD Tourism Trends and Policies 2024.
[76] Eurostat (2022), Trips by Purpose.
[77] Eurostat (2022), Trips by Purpose.
[78] Eurostat (2022), Expenditure by Purpose.

Figure 11-11: Formula and Inputs for Visits to Staff and Students Contribution

Formulas

$$\text{Visitor Spend} = (N_{students} + N_{staff}) * T_{(f)} * S_{(f)}$$

$$\text{GVA} = \text{Visitor Spend} * \frac{T_i}{G_i} * M(G)_i^2$$

$$\text{Employment} = \text{Visitor Spend} / \frac{T_i}{E_i} * M(E)_i^2$$

Inputs

$$N_{students} = number\ of\ students$$

$$N_{staff} = number\ of\ staff$$

$$\frac{T_i}{G_i} = \frac{Turnover}{GVA}\ ratio\ in\ industries\ of\ tourism\ spend$$

$$T_{(f)} = VFR\ trips\ per\ head\ of\ population$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ of\ tourism\ spend\ (i)$$

$$M(G)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ of\ tourism\ spend\ (i)$$

$$S_{(f)} = VFR\ spend\ per\ trip\ net\ of\ VAT$$

$$\frac{T_i}{E_i} = \frac{Turnover}{Employment}\ ratio\ in\ industries\ of\ tourism\ spend$$

11.5.2 Conferences and Events

The Aurora members also have an impact on tourism activity through hosting conferences and events. To estimate the economic contribution generated by these visitors, it was necessary to make a distinction based on where they came from and the length of their stay. This is because overnight domestic visitors, overnight overseas visitors and domestic day visitors have all different spending patterns. In addition, as done for visiting friends and relatives, it was necessary to consider that not all the visits would be additional.

Total visitor spending was then estimated based on the length of each conference or event and average spending per night of overnight visitors[79]. Domestic day visitors were assumed to spend around 50% less than the rate per night applied to each overnight visitor. Visitor spending was then discounted by the standard rate of VAT across each of the countries hosting Aurora members.

Direct GVA and employment were estimated by dividing turnover by the turnover per GVA and turnover per job ratios of those sectors where visitors spend their money.

[79] Eurostat (2025), Tourism statistics – expenditure, available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Tourism_statistics_-_expenditure

Type 1 and Type 2 multipliers were then applied to estimate indirect and induced contributions, as done elsewhere in this study. Details of the methodology followed are provided in Figure 11-12.

Figure 11-12: Formula and Inputs for Calculation of Conferences and Events Contribution

Formulas

$$\text{Visitor Spend} = A_{(o)} * S_{(F)}$$

$$\text{GVA} = \text{Visitor Spend} * \frac{T_i}{G_i} * M(G)_i^2$$

$$\text{Employment} = \text{Visitor Spend} / \frac{T_i}{E_i} * M(E)_i^2$$

Inputs

$$A_o = Overseas\ Attendees$$

$$S_{(F)} = Average\ visitor\ spend$$

$$M(G)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ of\ tourism\ spend\ (i)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ of\ tourism\ spend\ (i)$$

$$\frac{T_i}{G_i} = \frac{Turnover}{GVA}\ ratio\ in\ industries\ of\ tourism\ spend$$

$$\frac{T_i}{E_i} = \frac{Turnover}{Employment}\ ratio\ in\ industries\ of\ tourism\ spend$$

11.6 Students

11.6.1 Student Spending

Students spend money on a range of goods and services while they are studying. This expenditure supports the businesses where money is spent, their turnover and employment. The analysis of student contributions considers only full-time students, as part-time students tend to have different spending patterns, due to their labour market participation.

The first step in estimating the economic contribution from student spending was to establish how much students spend each month on a range of items, including housing costs, transport and other living expenses (e.g. food items). The analysis of student expenditure was based on data from the Eurostudent survey[80] [81]. It was estimated that on average across the countries of Aurora members, students who live with their parents spend (including transfers in kind) €874 per month, and students who live independently spend €1,236 per month. Spending by

[80] Eurostudent (2025), Students' Housing Situation.

[81] Eurostudent (2025), Students' Expenses.

accommodation type was then multiplied by the number of students living within that accommodation.

Monthly spending was then multiplied by the number of months that students spend at university. Bachelor's and master's students were assumed to spend nine months at university, with doctorate students spending the full year. Spending was then discounted by the rate of VAT, depending on the different goods and services purchased by students.

Total student expenditure was then divided by the turnover per GVA and turnover per job of the relevant economic sectors to estimate the direct GVA and direct employment generated by student spending. The turnover generated by students' spending on university-maintained accommodation was not considered, since this was already included as part of the universities' income.

To estimate indirect and induced contributions, it was then necessary to apply to direct GVA and employment, the appropriate Type 1 and Type 2 GVA and employment multipliers, as done in previous sections. Details of the calculations performed are set out in Figure 11-13.

Figure 11-13: Formula and Inputs for Student Expenditure Contribution

Formulas

$$\text{GVA} = M(G)_i^2 * \sum_a (Exp_{(a)} / \frac{T_{i(a)}}{G_{i(a)}}$$

$$\text{Employment} = M(E)_i^2 * \sum_a (Exp_{(a)} / \frac{T_{i(a)}}{E_{i(a)}}$$

Inputs

$$Exp_{(a)} = Student\ expenditure\ on\ commodity\ (a)$$

$$M(E)_i^2 = Type\ 2\ Employment\ Multiplier\ in\ industry\ (i)$$

$$M(G)_i^2 = Type\ 2\ GVA\ Multiplier\ in\ industry\ (i)$$

$$\frac{T_{i(a)}}{G_{i(a)}} = \frac{Turnover}{GVA}\ ratio\ in\ industry\ associated\ with\ student\ expenditure\ in\ commodity\ (a)$$

$$\frac{T_{i(a)}}{E_{i(a)}} = \frac{Turnover}{Employment}\ ratio\ in\ industry\ associated\ with\ student\ expenditure\ in\ commodity\ (a)$$

11.6.2 Student Part-Time Work

Students studying at the Aurora members also contribute to economic activity through their part-time work. In doing so, they support the operations of those businesses where they work. The number of students working part-time was

estimated based on student employment data from the Eurostudent[82] survey. The total number of students working part-time was then multiplied by the number of hours worked each week, based either on research from Eurostudent[83], or data from Aurora members.

However, not all the economic activity engaged in by students can be considered additional, that is, some of it would have taken place even if students had not carried it out. To estimate the extent of student part-time work's additionality, it was assumed that this would be negatively related to the unemployment rate of 16-24 years old in their country and Europe. This was calculated in line with the approach taken by BiGGAR Economics in the study of LERU members[84]. Across the countries hosting Aurora members, the average rate of additionality from student part-time employment was estimated as 75%.

To estimate the economic contribution from part-time work, it was necessary to estimate in which sectors students would work while studying. Based on evidence from the UK[85], it was estimated that more than two thirds of students work in either retail (38%) or in food and beverages activities (33%). The other main sectors of student employment are residential care activities, office administration and the leisure sector.

It was then necessary to estimate the number of weeks that students would spend in employment and divide this by the average number of weeks worked across those sectors. In this way, it was possible to estimate for each sector the number of jobs that students support. To estimate the direct GVA that is generated by students' part-time employment, it was then necessary to multiply the number of jobs in each sector by their respective GVA per job.

Type 1 GVA and employment multipliers were applied to estimate the indirect contributions generated by student part-time employment. Induced contributions were not considered because they were already considered as part of student spending. Details on the methodology followed in estimating the contribution from student part-time work are provided in Figure 11-14.

[82] Eurostudent (2022), Students' employment during the current lecture period, 2018-2021 aggregated data.
[83] Eurostudent (2022), Time spent on Paid Jobs, 2018-2021 aggregated data.
[84] BiGGAR Economics (2017) Economic Contribution of the LERU Universities: Supplementary Methodological Appendix
[85] BIS Research Paper Number 142: Working while Studying (October 2013).

Figure 11-14: Formula and Inputs for Student Part-Time Work Contribution

Formulas

$$\text{GVA} = M(G)_i^1 * (Employment * \frac{G_i}{E_i})$$

$$\text{Employment} = M(E)_i^1 * \left(SW * \frac{(H_{rs_{st}})}{(H_{rs_i})} * LSA_{(Study\ Area)} * \left(\frac{Months\ studying}{12}\right)\right)$$

Inputs

$$M(E)_i^1 = Type\ 1\ Employment\ Multiplier\ in\ industry\ (i)$$

$$M(G)_i^1 = Type\ 1\ GVA\ Multiplier\ in\ industry\ (i)$$

$$LSA_{(Study\ Area)} = Labour\ Supply\ Additionality\ in\ study\ area$$

$$Employment = Equivalent\ annualised\ employment\ in\ industries\ of\ student\ work$$

$$SW = Number\ of\ students\ with\ part\ time\ job$$

$$(H_{rs_{st}}) = Average\ weekly\ hours\ worked\ by\ students$$

$$(H_{rs_i}) = Average\ weekly\ hours\ of\ student\ employment\ in\ industries\ of\ student\ work$$

$$(Months\ studying) = Average\ months\ of\ the\ year\ spent\ at\ University$$

$$\frac{G_i}{E_i} = \frac{GVA}{Employment}\ ratio\ in\ industries\ of\ student\ work$$

11.6.3 Student Volunteering

Students at the Aurora members contribute to economic activity by volunteering during their studies. Their participation in these activities helps the organisations where they volunteer to expand their operations. In return, these experiences benefit students in several ways, including through the acquisition of skills that will be transferable once they will enter the labour market.

To estimate the value of their contribution, it was first necessary to estimate the number of students volunteering during their studies and the number of hours spent volunteering. These were based on data from the Aurora members, information from Eurostat[86] and the National Union of Students[87]. The number of hours spent volunteering was then multiplied by the average minimum wage rate for the countries of the Aurora members. The analysis only considered the direct GVA

[86] Eurostat (2023), Understanding youth engagement in Europe through open data. Available at: https://data.europa.eu/en/publications/datastories/understanding-youth-engagement-europe-through-open-data

[87] NUS Connect (2014), The Student Volunteering Landscape

contribution from volunteering activity, since activity was voluntary and did not constitute formal employment.

Figure 11-15: Formula and Inputs for Student Volunteering Contribution

Formulas
$\text{GVA} = M(\text{W}) * H_{rs_v} * SV$

Inputs
$M(W) = \ Hourly\ minimum\ wage$
$SV = \ Number\ of\ students\ volunteering$
$H_{rs_v} = \ Average\ hours\ volunteered\ by\ students\ per\ year$

BiGGAR Economics, Shandwick House,
67 Shandwick Place, Edinburgh, Scotland EH2 4SD

info@biggareconomics.co.uk

biggareconomics.co.uk