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Evaluation of Research at the University of Luxembourg

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Luc Soete, Shearer West, Erik Arnold, Katharina Warta
with Maria Pia Abbracchio, Francesco Giovannoni, Bart De Moor, Lucy Noakes, Wim van Saarloos

Executive Summary

The University of Luxembourg (UL) is a young institution in a unique setting, with a mission to support the higher education and research needs of the Grand Duchy in the 21st Century. Thanks in part to generous funding and its attractive context, LU has rapidly succeeded in establishing itself in all three missions of a university – delivering nationally-based higher education to the people of Luxembourg, punching above its weight in research, and making progress in sharing knowledge with wider society. Individuals at UL make big contributions to disseminating knowledge and understanding of its importance to society, though UL's work in wider knowledge transfer is at a comparatively early stage.

Creating and growing a successful research university in two decades is a great achievement. There are many good reasons for this, such as having educational foundations and a dedicated campus on which to build as well as the generous resources from the Luxembourg government, but as highlighted here, the skills of dedicated and experienced leaders, teachers and researchers, has played a significant role, explaining why the UL punches today in research well above its weight.

UL's next challenge is to pivot from growth to a phase of consolidation, in which it can continue to adapt to changes in science and the needs of society while maintaining or increasing its excellence and relevance. This requires increased flexibility in both the way the university operates and the governance structure and rules under which it does so. LU's revised vision and strategy provide a credible framework under which to do research to support scientific, economic and social development in Luxembourg while recognising the need for focus in a small university. UL has opportunities further to strengthen its hand through yet closer cooperation with the Luxembourg Institutes (LIs).

UL has been built on higher educational foundations laid down by its predecessor organisations, adding the aim not only to teach but also to be a research university. While it has succeeded in both functions, and despite creating Interdisciplinary Research Centres (ICs) to foster research that is not necessarily closely linked to teaching, there is potential to build more research groups or centres (disciplinary or interdisciplinary, as appropriate) in the departments or ICs, with the critical mass needed in modern research and the ability to outlive their founders' careers. This will reduce the fragility associated with small research groups and increase the resilience of the university as a whole.

The strategies presented to the evaluation panels by the departments and ICs were admirably bottom-up but tended to lack cohesion, a medium-term perspective and a clear link to the need for human and other resources in order to connect with the overall university strategy, which in turn should be more closely aligned with the strategic development of research in the faculties. A university built on bigger groups needs the ability to make clearer strategies and – as growth flattens – the ability to phase out less relevant activities at the same time as phasing in newer ones in response to the changing needs of science and society. This in turn means that human resource policy has to be re-tuned to the needs of a dynamic, but not necessarily quickly-growing, organisation that develops its own capacity in addition to recruiting from outside.

While the university has acted to tackle gender inequality, more should be done, especially to improve the family friendliness and the supportiveness to teamwork of the research culture.

We recommend that the university should:

- Scale up research groups in selected areas, to build a more flexible and sustainable organisation
- Develop more strategic capacity at department and IC level
- Improve human resource policies to support internal career development and consistent external recruitment, and ensure faculty appraisal criteria support working in larger teams
- Continue to improve policies for gender equality and inclusion, and support the development of a more family-friendly research culture
- Seek yet closer cooperation with the LIs through more joint projects, joint or adjunct appointments and more joint arrangements for PhD training

In addition, we suggest that the Ministry of Research and Higher Education:

- Review the governance structure, laws and rules under which the university operates with a view to increasingly its ability to consolidate after its start-up period and flexibly react to the changing needs of science and society by increasing its autonomy
- Review the health and efficiency of the LIs and university research together as a coherent system to provide holistic support to research, social and economic development in Luxembourg.

Table of Contents

1 Introduction and context 1

1.1 This evaluation 1

1.2 The previous (2016) research evaluation of UL 1

1.3 The University of Luxembourg 2

1.4 Disposition of the rest of the report 3

2 Quality and societal impact of research at UL 4

2.1 Quality of research 4

2.2 Societal impact 6

3 Structure: management and organisation of research 8

3.1 Governance 8

3.2 Internal organisation 9

3.2.1 Faculties 10

3.2.2 Departments 10

3.2.3 Interdisciplinary Centres 11

3.2.4 Common issues at the level of departments and ICs 12

3.2.5 Central management and administration 13

3.2.6 Institute for Advanced Studies (IAS) 13

4 Function: key processes for research 13

4.1 The policy context and the strategy of the university 13

4.2 Obtaining external research funding 16

4.3 Human resources 18

4.4 Research culture 20

5 UL in the national research and innovation system 21

6 Conclusions and recommendations 24

6.1 Conclusions and recommendations for the University of Luxembourg 24

6.2 Suggestions for MESR 28

Appendix A Departments' external research income 30

Appendix B Acronyms and abbreviations 31

1 Introduction and context

This Chapter introduces the current evaluation of research at the University of Luxembourg and its predecessor of 2016, discusses the university and its context, and presents the disposition of the rest of the report.

1.1 This evaluation

This 2024 evaluation of research at the University of Luxembourg (UL) builds on the results of separate evaluations of its 13 departments and 3 interdisciplinary research centres (ICs) at UL. These have been carried out by 16 peer panels, whose reports have been provided separately to UL and the Ministry of Research and Higher Education (MESR). This report addresses research management and governance at the level of the university as a whole. Its primary objectives as expressed in the terms of reference are to:

- *Assess the quality and the impact of the University's research activities across various disciplines (departments and interdisciplinary centres – ICs) in an international comparison, as well as the effectiveness of its strategy and internal governance*
- *Assess the effectiveness of the University's research strategy and the governance*
- *Provide recommendations for the future development of the research part of the University as well as for governance and management*

In line with its terms of reference, this report pays a lot of attention to the university's context in Luxembourg. While context is important to the way that all institutions perform, it is especially important in a small country. A university in Germany, for example, is one among many in a large system; it can safely specialise, in the knowledge that other universities will complement its activities. UL is the entire higher education sector in Luxembourg, and carries the weight of the country's needs and expectations upon its back. Institutions co-evolve with their contexts. So, UL both shapes and is shaped by what happens in the rest of the national research and higher education system, as well as in the economy and wider society.

1.2 The previous (2016) research evaluation of UL

The University Law that established UL required that the university be subject to external evaluation every four years. Recent practice has been to focus these evaluations alternately on education and on research. Thus, the 2016 evaluation focused on research, the 2020 evaluation on education, and this 2024 evaluation focuses once more on research.

A key overall message of the 2016 evaluation was that LU needed to move from its start-up phase into a phase of consolidation, tidying up and to some extent formalising how it did things and becoming clearer and more deliberate about its direction of travel. The evaluation was carried out in two parts. A focused research evaluation was done in 2016-2017[1], undertaking 13 peer reviews of research units and ICs. This found that the university had assembled highly skilled and motivated researchers in all positions by offering good salaries, infrastructure and working conditions, and set sensible university and unit-level research priorities. However, it also found that research strategies, career paths and human resources (HR), procurement and management of infrastructure, and university central support functions needed improvement.

[1] Rieder, Stefan; Balthasar; Andreas; Haefeli, Ueli; Schlapbach, Louis; Dolder, Olivier; Iselin, Milena; Roose, Zilla; Thorshaug, Kristin (2017): Evaluation of the University of Luxembourg, Interface Policy Studies, Research, Consulting, Lucerne

The relationship between faculties and the ICs was unclear, and there were concerns about the efficiency of the complex top-level governance organisation structure and the high degree of influence of the Luxembourg government in governance. Processes for research planning and budgeting were not consistent across the university, and UL needed to become more explicit about the roles of the faculties, department and ICs. The Strategic Framework adopted for 2016-2026 set out initial plans for UL to select and focus on a limited number of top-tier research areas based on clear criteria and use these to sharpen its research profile. A more explicit internationalisation strategy was needed. As part of the consolidation process following LU's initial growth, the evaluation found that the university should develop a career development scheme for academic and non-academic staff, as well as a gender action plan.

A second, institutional evaluation by a team assembled by the European Universities Association[2] reviewed the university overall, tackling both teaching and research. Key findings of the institutional review were that UL was emerging from its growth phase and should now start consolidating, freeing itself from the administrative and cultural legacy of the four earlier organisations on which UL had been built. This meant the university needed to standardise its operating procedures, develop a common budgeting process and link this better to strategic planning.

1.3 The University of Luxembourg

UL is the unique university in a unique country. Luxembourg shifted its economic base from farming to iron and steel in the Nineteenth Century, and to financial services in the Twentieth. Around the turn of the Twenty-first Century, a small group in MESR succeeded in driving through the idea that Luxembourg needed a university to support industrial renewal, the development of a knowledge society[3] and to avoid being left behind in the international massification of university education. Finally, the purposes of the university came to include combating brain drain from Luxembourg via foreign universities through the provision of a local alternative and building the knowledge base needed for industrial modernisation in Luxembourg[4]. UL was then established by the Higher Education Act of 2003, bringing together four predecessor organisations: the *Centre universitaire* (which previously had the job of preparing Luxembourgish students for degree studies abroad), the *Institut supérieur d'études et de recherches pédagogiques*, the *Institut supérieur de technologie*, and the *Institut d'études éducatives et sociales*. During preparatory meetings for this evaluation, public authorities also emphasised the importance of having a research as well as a teaching university alongside the longer-established Luxembourg Institutes (LIs) in order to attract foreign direct investment and maintain an up-to-date innovation infrastructure for industry and society.

Figure 1 shows that UL now educates some 12% of bachelors and masters students from Luxembourg, and that the number of such students registered at UL grew rapidly in the university's early years before reaching a plateau and, more recently, starting to grow again at a slower rate. The expectation is that the size of the university is stabilising, and hence that it has moved beyond its growth phase and is entering a period of consolidation and change

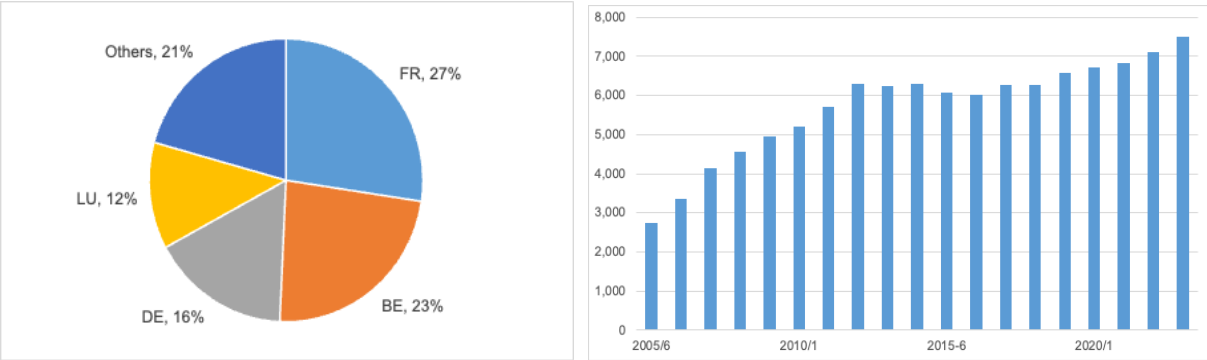
[2] Norén, Kerstin; Lanarès, Jacques; Dzimko, Marián; Chevallier, Thierry; Treml, Beate; Purser, Lewis (2016) University of Luxembourg Evaluation Report, Institutional Evaluation Programme, European Universities Association

[3] Gibbons, Michael; Limoges, Camille; Nowotny, Helga; Schwartzman, Simon; Scott, Peter; Trow, Martin (1994) *The New Production of Knowledge.* London: Sage

[4] Harmsen, Robert; Powell, Justin JW (2020) Higher Education Systems and Institutions, Luxembourg. In: *Encyclopedia of International Higher Education Systems and Institutions,* s.l.:Springer; Braband, Gangolf; Powell, Justin. JW (2021) European embeddedness and the founding of Luxembourg's 21st century research university. *European Journal of Higher Education*, 11(3), pp. 255-272

management. This will increase the importance of setting priorities, which may increasingly differ between education and research.

Figure 1 Where Luxembourg's students study, 2022/3, and UL registered bachelors and masters students 2005/6-2023/4



Source: LUSTAT

From the start, the intention was to build the university some 20 km outside the City on a new campus at Belval, as part of a larger regeneration plan for what had previously been the heart of the Luxembourg steel industry, gradually moving from the university's original site at Limpertsberg and its more recent locations at Kirchberg. The relocation process has taken longer than intended, in part because construction is in the hands of the Ministry of Mobility and Public Works, slowing the relocation of some labs and leading in some subjects to a separation between undergraduate and postgraduate education.

The size and location of Luxembourg mean that UL's context has created both limitations and opportunities for the university. It limits the scale of the university and hence the variety of degree subjects that can be taught and the number of research areas in which UL can maintain a sustainable scale. Luxembourg's multilingual culture, the large number of people who cross borders for work or as immigrants, and the proximity of important cities in France, Germany and Belgium create both cultural and linguistic barriers, but also a rich environment that functions as a research lab. The openness of the borders also enables UL to operate within the 'Greater Luxembourg' region, both to cooperate with researchers at neighbouring universities and to address a wider set of societal questions and needs.

1.4 Disposition of the rest of the report

Having briefly introduced the university and its context, Chapter 2 of this report discusses the quality and societal impact of UL's work. Chapter 3 looks at how well the structure of the university supports the research, while Chapter 4 considers functions the university performs in creating an appropriate context for good research. Chapter 5 describes the roles of the Luxembourg Institutes (LIs) and uses international experience to suggest how UL and the LIs could most productively 'cohabit' in the Luxembourg research and innovation system. Chapter 6 presents the conclusions and recommendations of the institutional-level evaluation.

2 Quality and societal impact of research at UL

This Chapter reflects the peer panels' generally positive views of the quality and impact of UL research at department and IC levels, adding some additional supporting evidence.

2.1 Quality of research

Two decades after its foundation, UL has established itself in numerous scientific fields with good, and in some cases, excellent research output. Publications per full-time equivalent (FTE) researcher have grown considerably and show above-average citation performance. In some areas like physics and engineering, computer sciences and mathematics, and, more recently, also in biomedical and health sciences, UL researchers have produced publications in the 1% of most-cited papers in their field worldwide. The evaluation panels consistently report positively or very positively on the research quality of these entities.

UL's claim to be a research university is underpinned by the three ICs, but there are also very good research groups with international visibility and relevance in the faculties. UL is characterised by good financial resources through its state endowment. This has enabled the university to make targeted investments in recruiting top academics, and to invest in excellent and efficient infrastructure, in the ICs, and also in the faculties. It also allows smaller research groups to conduct research alongside their teaching activities without the degree of pressure experienced at many other the universities to seek external funding. The academic freedom associated with this is realised in dedicated, bottom-up research.

All the ICs have succeeded in advancing to the forefront of research in specific fields. Examples include: neurodegenerative and rare diseases and systems biology in the Luxembourg Centre for Systems Biomedicine (LCSB); in space systems and cybersecurity in Luxembourg Centre for Security and Trust (SnT); and in the Luxembourg Centre for Contemporary and Digital History (C^2DH) high-risk and interdisciplinary projects that, among other things, ask how historical and social research issues such as European crisis resilience can be addressed using digital methods and tools.

Departments also produce some excellent research. Areas that have been highlighted for their excellent quality and visibility include AI and security, geometry, physics, finance, migration and borders research. Advanced interdisciplinary approaches are highlighted, as well as research relevant to the specific Luxembourgish context.

Table 1 shows UL's field-normalised shares of the most highly cited journal articles from the Leiden Ranking, confirming its strong performance in terms of citations at four levels.

Figure 2 breaks down the university's citation performance over time by broad fields of research. This is volatile because the numbers of papers and researchers are small, so individuals can make a difference. It also involves comparing UL researchers working in a limited number of sub-fields with average numbers of citations in entire fields, so it is possible for UL researchers to be more (or less) highly cited in their specific sub-fields than in their field as a whole. It is therefore important to note both the bibliometric and the peer review evidence to get a rounded view of performance.

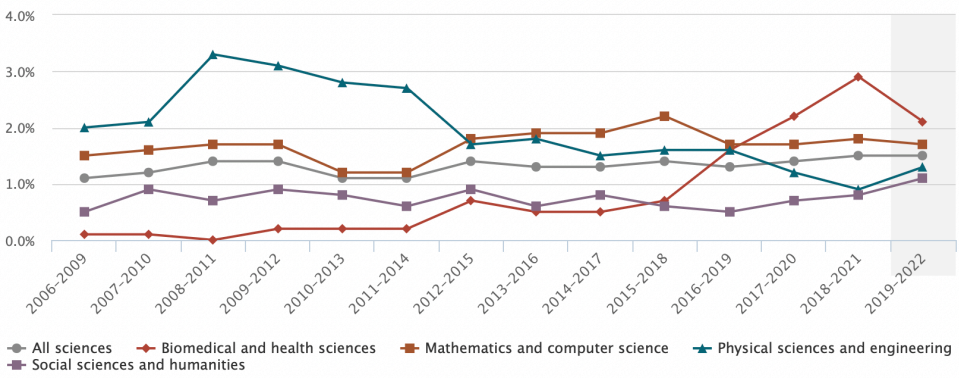
The biomedical scientists at UL have built from a low base to be present more than twice as often in the Top-1% of articles as would be expected. In contrast, the physical sciences and engineering have fallen from an early peak to only a slightly better-than-average citation performance. Social sciences and humanities tend to hover below, and mathematics and computing somewhat above, average citation levels.

Table 1 Citation performance of the University of Luxembourg from Open Leiden ranking, 2019-2022

Indicator	Number of publications of a university belonging of the top 1% of their field		Size-independent: Proportion of the publications of the university belonging to the top n% of their field	
Publications	P	1914	%	
Top 1% publications	P(top 1%)	29	PP(top 1%)	1.5%
Top 5% publications	P(top 5%)	138	PP(top 5%)	7.2%
Top 10% publications	P(top 10%)	251	PP(top 10%)	13.1%
Top 50% publications	P(top 50%)	1096	PP(top 50%)	57.3%

Source: Open Leiden ranking, 2019-2022

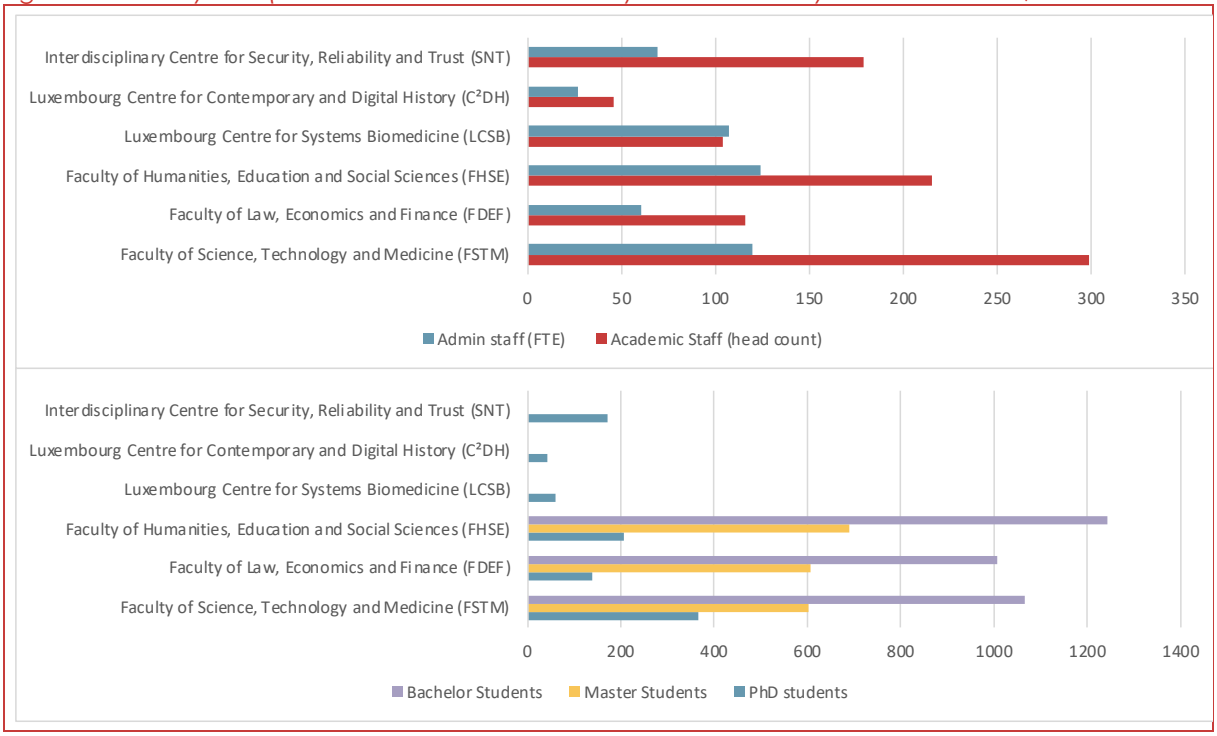
Figure 2 Share of publications among the top 1% most cited in the world, per field and ranking period



Source: Open Leiden ranking, https://open.leidenranking.com/ranking/2024/university/473

The panel visits to all 13 departments and the 3 ICs made it clear that there is also a high potential for research activity that has not yet fully been realised. One of the main reasons for this is that the balance between research and teaching varies. Teaching obligations have a significant impact on research. First, faculty recruitment has to be led by the thematic coverage needed for teaching. This impedes research specialisation, encouraging many small research groups to organise around a single full professor per area, rather than building bigger, stronger thematically-focused research groups. Second, where teaching loads are high, incentives to seek external funding are reduced. Figure 3 compares the numbers of university staff with the numbers of students per faculty and IC. It shows that, in line with international trends, the Faculty of Law, Economics and Finance (FDEF) has almost as many students as the Faculty of Science, Technology and Medicine (FSTM), but significantly fewer staff and a significantly lower share of PhD students, indicating the strong vocational training mission and a related teaching load in this area. The Faulty of Humanities, Education and Social Sciences (FHSE) has the most students and is nearly twice as big as FSTM in terms of UL staff, whereas the Faculty of Science, Technology and Medicine (FSTM) has a stronger focus on research. This is further strengthened by two Interdisciplinary Centres in related research fields.

Figure 3 University staff (academic and administration) and students by faculties and ICs, 2023



Source: Data: UL, calculation and presentation: Technopolis
Note: 'administrative' staff in this diagram includes technical and teaching support staff

This leads to the issue of the appropriate research strategy in a phase of consolidation. The 2017 evaluation recommended that the research groups should become departments, with greater thematic coherence and size. Indeed, in the current evaluation the resulting departments presented themselves as larger thematic groups, often in line with one of the three strategic research themes of the university. However, the panels nonetheless pointed to a lack of longer-term strategy. Departments and ICs tended to present static mappings of ongoing research as their strategy, rather than being able to explain how they were setting priorities about what research to pursue, and what to avoid, in order to build sustainable strategic units and advantages in the competitive world of research. A shift from growth to consolidation cannot be successful if it is seen as a movement from dynamism to stasis; rather, it requires a change from growth management to change management to maintain dynamism and competitiveness within institutional limits to growth. Incentives to build more sustainable research expertise – for example through third-party and European funding – seem to be insufficient, particularly in those departments whose structure is based on teaching. Nevertheless, close, good-quality links between research and teaching, and generous and high-quality support for PhDs can be recognised throughout.

2.2 Societal impact

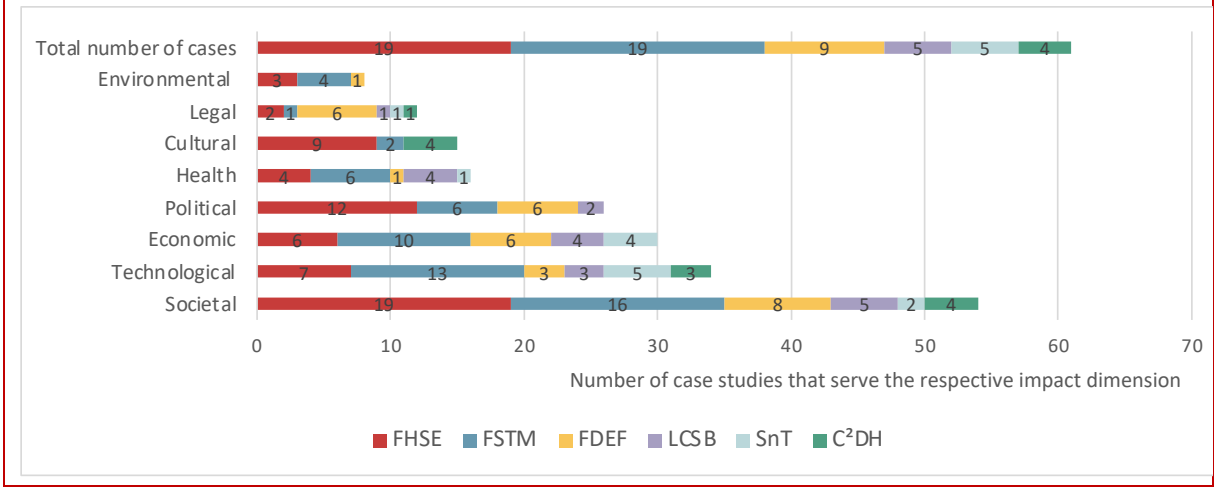
Figure 4 is based on a total of 61 impact case studies prepared by the departments and ICs of the UL, each entity preparing between two and five depending on its size. The Figure indicates by faculty and IC the impact dimensions covered.

Overall, almost 90% of the cases report societal impact. This is most often, but not only, related to communication activities or training, awareness and knowledge creation. It is followed by technological impact, with contributions from all faculties and ICs. Political and economic impact is claimed in about half of the cases. Health is addressed by case studies from all faculties and two ICs. Cultural impacts are only addressed by C²DH and FHSE.

The Faculty of Humanities, Social Sciences and Education (FHSE) is the only one whose case studies cover all impact dimensions. This indicates the importance of societal impact in these areas, and also the broad thematic coverage of this faculty.

Given that the fourth dimension of the UL research strategy is sustainable and responsible development, it is notable that environmental impact is rarely mentioned.

Figure 4 Impact dimensions covered by the impact case studies



Source: Self Evaluation Reports of the departments and Interdisciplinary Centres

The evaluation panels were broadly positive, and in some cases very positive, about departments' and ICs' engagement in society and knowledge transfer. In some areas this societal relevance is the main driver of high research quality, as for instance in educational research or behavioural and cognitive sciences, or the work of the UniGR-Centre for Border Studies. These are examples of how the research groups can be attractive cooperation partners thanks to their good facilities, the quality of their researchers, and their use of interdisciplinary research projects to address socially relevant issues. Several departments commented that such impact pathways are not well recognised in researchers' career development.

The university is also a relevant knowledge hub for the public sector through chairs financed by ministries and the activities of the LUCET research and transfer centre. However, UL's performance in the third mission has limitations. In several cases, enthusiastic individuals promoted research by organising events targeted at citizens, such as conferences, school visits, citizen science experiments, mathematical contests and games and so forth, but the extent of departments' and ICs' knowledge exchange with industry and the public sector were more variable. Departments and ICs described the generation of small numbers of spin-off firms, but it was clear that the university's technology transfer function is still nascent and may not yet have developed the critical mass and the breadth of knowledge needed to be effective across multiple technologies and industries[5].

An additional issue may be that the pre-existence of applied institutes like the LIs can provide industry and government with sources of knowledge that are better attuned than a university

[5] Universities, especially small ones, tend to lose money running TTO services, so a larger-scale venture may be needed in order to be effective, perhaps in collaboration with the LIs

to their needs. The engineering panel, for example, was surprised at how sparse the engineering department's links with industry were. In a context like Luxembourg where the institute sector is large, it may be more efficient for universities to ally with institutes to support knowledge exchange. A leading example of this is the alliance between NTNU and SINTEF in Norway. Such an arrangement would provide industry and government with a more user-focused interface and support the division of labour the government intended between UL and the LIs, where the university focuses on more fundamental research than the institutes so that the two types of organisation are mutually supportive.

3 Structure: management and organisation of research

This Chapter works systematically through the organisation of the university, discussing where relevant how each part relates to research.

3.1 Governance

UL is currently regulated by the University Law of 2018[6] and governed by MESR via performance contracts, renewed at four-year intervals. The contracts build on 4-year plans submitted by UL, and contain requirements to undertake specific activities such as establishing new research centres and implementing open access principles. They also set numerical targets (KPIs) for winning funding, publications and so on.

Beyond this, MESR regards its governance of the university as predominantly 'hands-off'. UL's institutional funding is specified as a lump sum in the contract. The Ministry does not formally tell the university how to divide it between teaching and research, nor is the institutional funding tied to specific numbers of degrees or courses.

MESR provides UL with specific targets for teacher training, which is funded from the institutional block grant. It also has a separate agreement with the university providing funding and targets for education in nursing and midwifery. The university's performance contract makes it clear that other public authorities are also permitted to provide similar funding in support of their sectoral goals. This could potentially provide ways for UL to expand its activities in directions the government sees as socially desirable.

The 2018 University Law introduced some reforms that appear to support UL's transition from growth to a more stable existence. It changed the rules for employment to allow internal academic promotions, in addition to external hiring. It also increased the size of the board from 7 to 13 voting members. At both stages the chair and one other member have been from Luxembourg industry, while other members have predominantly been international academics. In line with modern practice, the Board of Governors is dominated by external representatives and now includes representatives of the staff and students. It normally meets six to seven times per year, while the chairman of the board and the rector meet weekly. The rector and a representative of MESR are non-voting board members, but the MESR representative has a right of veto.

A majority of board members is appointed by the government and the board in turn nominates the rector, vice-rectors, professors, and the heads of the ICs. Faculty deans are nominated by the board and elected by the professors from among their own number.

[6] The most recently amended version can be found at https://www.uni.lu/wp-content/uploads/sites/9/2023/11/Loi-du-27-juin-2018-modifiee-ayant-pour-objet-lorganisation-de-lUniversite-du-Luxembourg.pdf

The board is supervisory; the rectorate is executive. While some of the departmental evaluation panels were told that the board has in the past intervened in the definition of professorial positions and the choice of candidates, the institutional evaluation panel was informed that this is not currently the case. The latest (2023) UL governance report shows that the board approved various changes and activities at the university that have significant financial implications, and approved the appointment of professors.

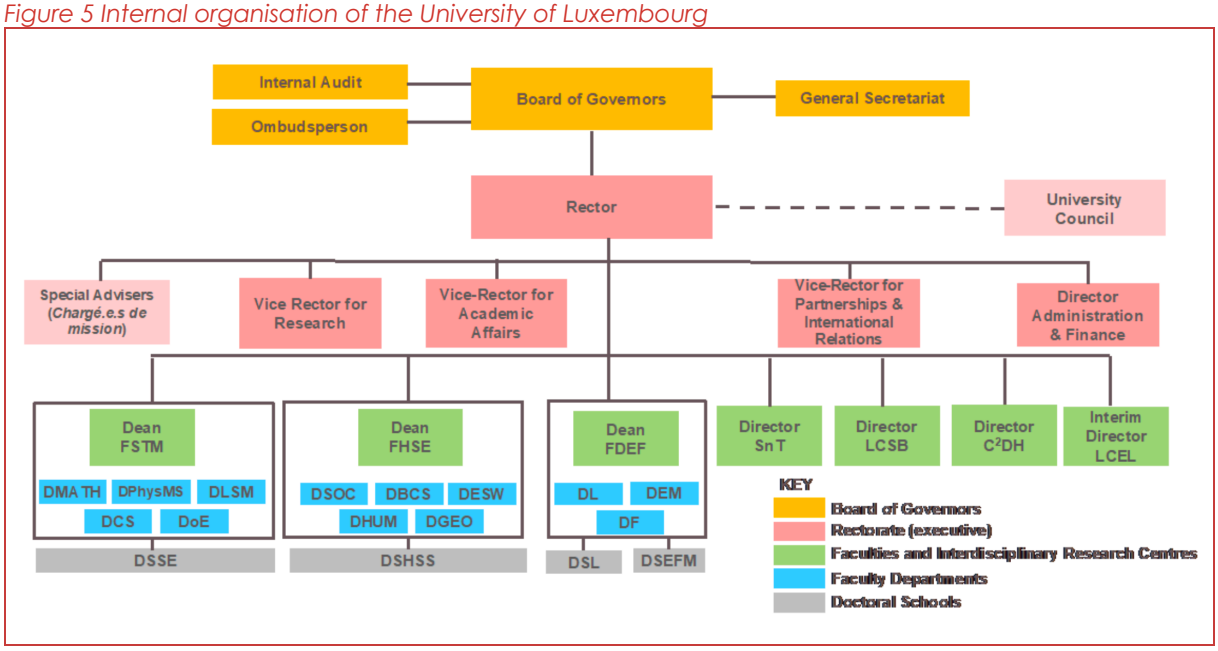
UL also has a University Council of members elected by the faculties that handles academic matters and whose opinions are said traditionally to be respected.

3.2 Internal organisation

Figure 5 shows the current internal organisation of UL. Important characteristics include:

- It establishes the rector as the single point of contact for the external governance via the board and through the board to MESR and potentially other ministries that may fund the university. The rector functions as the interface between the external and internal governance
- It separates the management of the departments, which are primarily teaching orientated, from that of the ICs, which are research focused. The departments and ICs have different 'business models' but nonetheless are active in all three of the university's missions
- The senior leadership team comprises the rectorate, the three deans of faculties and the directors of the ICs. At the end of the evaluation period there were three directors, but two additional ones have since been appointed and the University Law leaves scope for a sixth to be created, enlarging the leadership team but also potentially unbalancing it between teaching and research
- In principle, the faculties reduce the span of control for the rector by clustering departments. The faculties provide important services to the departments ranging from administration through research and funding services to managing doctoral schools. However, they also increase the distance between research strategy-building at the department and university levels, so it appears that the university strategy is built top-down based on government and societal needs in a way that defines a space for action, while the departmental strategies are built bottom-up so as to fit within that space, without the interconnection between the two levels being well defined or priorities being set
- The departments have, to varying degrees, their own 'customer groups' in Luxembourg such as the health sector, school education, the Chamber of Commerce, companies in various sectors such as logistics, and so on

Figure 5 Internal organisation of the University of Luxembourg



Source: UL self-assessment report

3.2.1 *Faculties*

In addition to their role in teaching, the faculties provide a middle management layer for the research activities of the departments. The departments generally appear pleased with the faculties' roles as facilitators, providing some internal research funding, research support staff, financial controllers, programme administrators, help in applying for external funding, and small capital expenditures (up to €60k). Other services provided by the faculties include establishing external partnerships, facilitating outreach and providing quality frameworks for teaching and research.

The faculties each operate a doctoral school, together providing 12 disciplinary doctoral programmes. The Department of Law separately runs its own doctoral school and programme. An Office of Doctoral Studies in the central university administration coordinates the schools and establishes common procedures for UL doctoral education.

Departmental budgets are mediated by the faculties, so deans negotiate upwards with the rector for faculty budgets and downwards to allocate departmental budgets. The faculties are also responsible for employing academics, PhD candidates and support staff.

Each faculty addresses many disciplines, so it is difficult to have a faculty-level research strategy. Hence, in practice, department heads appear to negotiate with the rectorate rather than the deans about thematic aspects of research strategy. While the faculty level recognises that department strategies tend to be poorly developed and articulated, it does not evidently play a role in quality-assuring these strategies.

3.2.2 *Departments*

The history and pre-history of the university have clearly influenced the departments. They appear primarily to be built around their teaching role, providing higher education to the Luxembourg public, often in relation to specific professions or branches of industry but also via disciplinary, as well as practice-orientated, degrees. In this way, they tackle both the specific needs reflected in Luxembourg's existing social and industrial structure, but also provide

knowledge to support further development in what is becoming an increasingly knowledge-based society.

In many cases, partly due to the high wages and attractive employment conditions available, departments have recruited from outside very good individual researchers, who continue the good publication performance that made them attractive recruits. Those hired experience a high degree of freedom to choose what research they do. The need for a broad range of specialists to cover all the needed aspects of degree teaching, however, tends to keep the departments' research fragmented. Small teaching-focused departments can find it difficult to keep up with changes in research practice in many fields that are moving towards team- rather than individual work.

For at least the last 30 years, research funders internationally have been funding centres of excellence and increasing grant sizes to encourage researchers to work in groups rather than individually. This means that UL's international competitors tend to work in bigger groups than UL.

Maintaining a traditional, fragmented department structure is risky, especially in the absence of a holistic human resource policy. Replacing retiring professors one at a time risks that departments simply try to plug the gaps they leave behind, rather than using the opportunity the retirement provides for a change in research direction. Where continuity is needed, working in groups and doing longer-term human resource planning would increase resilience. PhD candidates could then be better supported and would not become stranded if their professor retires. It would also become possible for staff to access the larger research grants available internationally, to establish and maintain industrial, as well as academic, networks, and to maintain strong positions in international research collaborations, notably the EU Framework Programme.

Panel reports in this evaluation clearly point to a fragmentation of research in the departments (and in the ICs) and a consequent lack of departmental priorities and strategies – a weakness that appears to be recognised at faculty level but which the faculties so far have not been able to address. UL provides incentives – both within the faculties and at somewhat larger scale in the Institute for Advanced Studies – for interdisciplinary research and crossing departmental boundaries. However, there are few incentives for group-building *within* departments or ICs.

Some departments are increasing the number of masters courses offered, often for very small numbers of students, thus reducing the resources available for research. UL's performance contract with MESR does not provide incentives to increase student numbers, so departments do not appear motivated to build efficiencies or scale in teaching.

3.2.3 Interdisciplinary Centres

At the end of the evaluation period there were three ICs. Since then, two more are starting up. One further IC can be created without amending the University Law. IC directors have the same status as faculty deans. The ICs are intended to provide the pillars of research excellence in the university. Panel reports confirm that the quality of the ICs' research is very good, though not always excellent.

The three ICs in scope for this evaluation were: the Luxembourg Centre for Systems Biomedicine (LCSB), the Luxembourg Centre for Security and Trust (SnT), and the Luxembourg Centre for

Contemporary and Digital History (C²DH).[7] Table 2 shows the distribution of staff in the three ICs. A key attraction of working in an IC was said to be increased freedom to choose one's own research topics. The IC members' lower teaching load (half that of the departments) means that the ratio of fixed-term to permanent contracts is well above the university average.

LCSB and SnT each have 18 research groups, while C²DH has four, so the ICs are in practice rather fragmented. Taking academic and technical staff together, that implies group sizes of around a dozen people – plus any PhD candidates associated with the groups. Small numbers of full professors and other academic staff leverage large numbers of post-docs and PhD candidates. The SnT panel argued specifically that the permanent staff members were over-leveraged and more professors were needed.

Table 2 Number of IC members, 2023 (headcounts)

	C²DH	LCSB	SnT
Total academics	46	104	179
Full professors	5	11	9
Postdocs	27	71	126
Other academic roles	14	22	44
Non-academic staff	32	119	76
Technical staff	16	77	76
Admin/Finance	16	42	
PhD candidates	47	89	217
Grand total	125	312	472

Source: IC self-evaluation reports

In principle, the ICs have greater opportunities to build research scale and focus than is possible in the departments. However, the two older ICs have grown by incrementally adding research groups, maintaining a pattern of fragmentation. The research agendas of the ICs are to a considerable extent developed bottom up. While SnT clusters its research groups into four Strategic Research Areas, these appear to be more descriptive than prescriptive. All three ICs were said by the panels to lack sufficiently well-developed strategies, to be unclear about the medium-term aspects of strategy and the implications of strategy for human resource management.

3.2.4 Common issues at the level of departments and ICs

All 16 panels were impressed with the level of institutional funding and infrastructure provided to the departments and ICs. Two of these raised the need for support with chemical analysis and synthesis, framing this in terms of a need to have a chemistry department, although there is an international trend towards no longer having separate chemistry departments.

The panels were almost all critical of the adequacy of strategy at the department or IC level. Departments' weak research strategies were mostly seen as resulting from a teaching-driven structure that leads to fragmentation. The three ICs in scope to the evaluation – two of which

[7] The LCEL – Luxembourg Centre for European Law, formerly the Max Planck Institute for International, European and Regulatory Procedural Law (MPI), was integrated into the University on 1 January 2024, the Luxembourg Centre for Socio-Environmental Systems (LCSES) started in 2025.

are large – also had many small research groups and made little effort to create IC-level strategies.

3.2.5 *Central management and administration*

Most of the commentary in the panel reports regarding central management and administration relates to the slowness and complexity of professorial appointments. There were more general observations about excessive bureaucracy and complex form-filling (for example, in relation to procurement of lab equipment and consumables). The concern seems genuine and is noted, but this kind of evaluation is not equipped to tackle the issue more closely.

Some departments based outside Belval pointed to the loss of time and barrier to collaboration caused by travelling between campuses, as a result of delays to the construction plan for Belval.

3.2.6 *Institute for Advanced Studies (IAS)*

This somewhat misleadingly named part of the central administration is an internal funding agency rather than a research performer, offering four types of grants in support of establishing and building interdisciplinary partnerships within the university. Most of the awards are small, but the Audacity grants – of which there were 15 at the time of the self-evaluation report – can be as much as €400k over three years, so they can, in principle, play a role in scaling up interdisciplinary cooperation. IAS funds investigator-initiated proposals, setting no priorities beyond the requirement for projects to be interdisciplinary. It therefore misses the opportunity to help implement UL's thematic priorities.

While IAS encourages the formation and development of interdisciplinary research, UL lacks incentives for **intra**-disciplinary scale-building. This is an important gap in the university's ability to compete in an international research landscape where larger groups are in many cases increasingly important.

This evaluation has no evidence about the quality or broader success of IAS-funded research.

4 Function: key processes for research

While the previous Chapter discussed the 'hard' side of UL's organisation, this Chapter discusses how the 'soft' or process side of the way UL works affects research.

4.1 The policy context and the strategy of the university

The university's self-evaluation report wisely points out the importance of focus in UL's strategy. "As a medium-sized University in a compact country, *we can neither do nor be excellent in everything.*"

Since the last research evaluation in 2016, government has clarified its strategy for research and innovation. The Ministry for Higher Education and Research (MESR) published a National Research and Innovation Strategy[8] in 2020 that prioritised:

- Industrial and service transformation
- Personalised healthcare
- 21st Century education
- Sustainable and responsible development

These areas are seen as overlapping and interdisciplinary, and now guide a large part of the research funding provided by the Luxembourg National Research Fund (FNR). This funds not only research in the higher education and research institute sectors but also collaborative projects between them and with industry in Luxembourg. FNR's thematic programmes are consistent with the national priorities, while – in line with normal research council practice, internationally – its smaller bottom-up research programmes are not thematically limited. In practice, the prioritised themes are extremely broad, covering many of the themes UL tackles in education and research.

UL's original strategic focus in research was defined in terms of disciplinary priorities and research groups. Following the 2016 research evaluation and the revised University Law of 2018, the disciplinary research groups were reorganised into departments. A strategy process starting in 2019 generated an (unpublished) Strategic Framework 2020-2039 for the university. This is implemented via four-year plans that are presented to MESR and which provide the bases for its successive four-year performance contracts with UL.

The Strategic Framework underpins the university's vision and the way it is implemented (Figure 6). The vision emphasises LU's role in Luxembourgish society, while the Mission-Profile indicates that the university's role in supporting the economic and social development of the country depends on its ability to do research as well as higher education, increasing the postgraduate-level skills of both the university and Luxembourg's labour force. Its values are largely those of good higher education everywhere, but are distinctive in their emphasis on being international and multilingual as well as explicitly being grounded in society.

UL's strategic goals are currently described (adding a more explicit focus on education, compared with Figure 6) as:

- To reinforce its international profile as an outstanding research university
- To strengthen its teaching and establish new forms of learning
- To add value to society and meet emerging societal challenges
- To strengthen and encourage interdisciplinarity[9]

While the Strategic Framework represents a shift from a disciplinary to an interdisciplinary focus, in fact the three ICs in scope to this evaluation were established much earlier[10], with the intention of creating places within the university focused on research excellence rather than teaching.

The key research areas identified are broadly consistent with the national priorities, problem-orientated, and socially embedded. Such societal goals tend to be inherently interdisciplinary.

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[8] MESR (2020) National Research and Innovation Strategy for Luxembourg

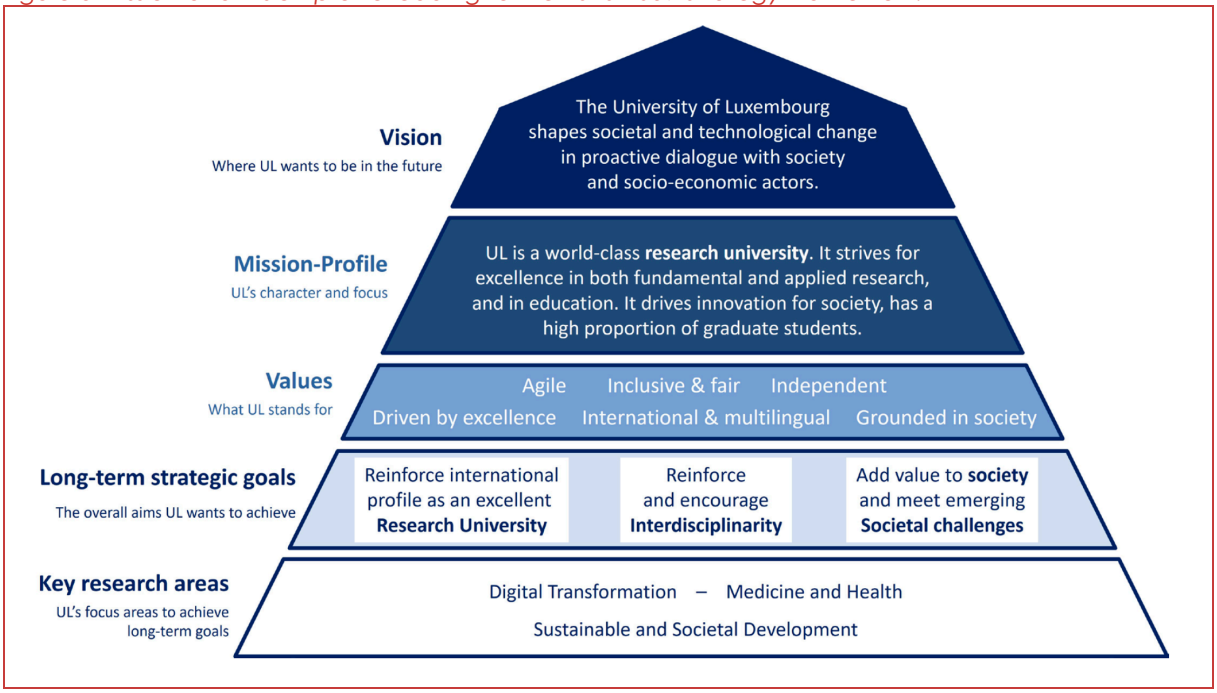
[9] https://www.uni.lu/en/about/profile/mission-strategy-values/ accessed 23 Mach 2025

[10] SnT 2009, LCSB 2011, C²DH 2016

While the university is rightly proud of its rising position in various university league tables, the strategy does not set specific or comparable objectives that would help the university assess its degree of success.

The self-evaluation report points out that such goals should not be set in stone, noting that the current four-year plan needs to respond at least to (i) the acceleration in AI, Quantum and Data Science (ii) the gain of momentum to drive the Medicine and Health portfolio, (iii) the importance of sustainability challenges, and (iv) commitment to Educational Sciences in a multilingual and multicultural context.

Figure 6 Mission and Vision profile leading to the 2020-2039 Strategy Framework.



Source: UL self-assessment report

The self-evaluation describes the strategic process as being launched in October 2019 via interviews with the Board of Governors, rectorate, the deans and directors, and MESR, as well as international benchmarking. One hundred members of the UL community were consulted in ten workshops and there was also a strategic retreat with the Board of Governors, the rectorate, deans and directors.

The rector leads the implementation as well as the design of the strategy. The key research areas provide useful focus to the strategy, relating to a sub-set of the university's research.

- **Health and medicine** focuses on the Department of Life Sciences and Medicine (DLSM) and the Luxembourg Centre for Systems Biomedicine (LCSB), with initiatives in medical education, training in a number of specialised medical fields, parts of biomedical research (especially in neurosciences and oncology), and nursing education, to a considerable degree following up the university's ambitions to grow a medical faculty
- **Digital transformation** aims both to make sure UL has the skills and equipment needed to teach and do research in the context of rapid digitalisation of research and society across all disciplines, and a need for both the university and Luxembourg society to keep up with

the rapid pace of change in order to remain competitive and maintain a modern economic structure

- **Sustainable and societal development** mainstreams sustainability across the university's education and research, and supports the new Interdisciplinary Centre being established in environmental systems

These priorities implicitly need to be tackled in the annual planning and budget processes between the deans and centre directors on the one hand and the rectorate on the other. The individual priorities do not appear to be the responsibility of specific functions or people below the level of the rectorate or to be linked to specific external partnerships or stakeholders. While these three areas are helpful for ICs and departments active in them, they provide less guidance for departments whose primary mission is higher education. They lead to artificial thematic attribution and the formation of groups for the sake of a top-down strategy, which effectively reduces strategic power.

4.2 Obtaining external research funding

UL's external research income across all the faculties and ICs was €411m in 2018-23, of which 59% came from FNR, 18% from other Luxembourgish sources, 20% from EU programmes and 4% from other international sources. FNR therefore plays an important role in quality-assuring the research it funds and in channelling most of the money towards national objectives. The Luxembourg Institutes provide competition for the university in some fields, but by no means in all. Luxembourg industry provides 4% of UL's external research income.

The proportion of EU funding is high compared with many other countries, demonstrating that Luxembourgish researchers have the networks, quality and capacity to be members of successful Framework Programme consortia. It is important to sustain and improve this success further for at least three reasons:

- While FNR's priorities are important and reflect the national interest, parts of the Luxembourgish research community legitimately have different concerns and different funding needs
- There are few alternative sources of research funding to FNR within Luxembourg
- Luxembourg's small size means that most research collaboration must be international, and is therefore internationally fundable

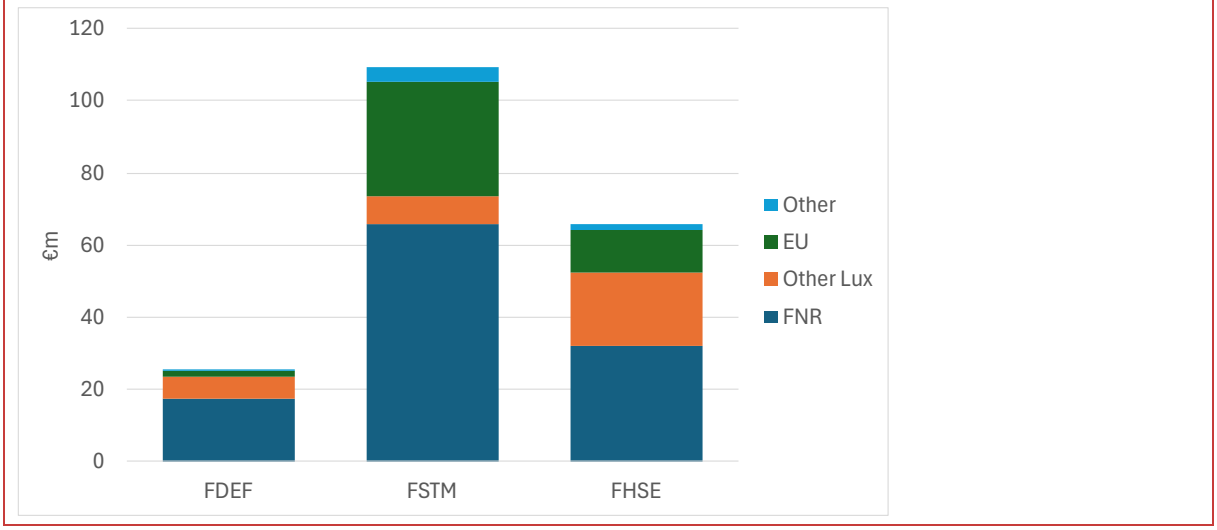
Figure 7 shows that the Faculty of Science, Technology and Medicine (FSTM) is the major beneficiary of external funding, chiefly from FNR and the EU. The Faculty of Law, Economics and Finance (FDEF) uses the least external funding, relying almost entirely on FNR, the public sector (mostly for supporting professorial chairs), and other non-industrial funders in Luxembourg. The Faculty of Humanities, Education and Social Sciences (FHSE) relies on FNR but also public authorities in Luxembourg, especially in education and social policy. There are no surprises here, confirming that – while there is always scope to do more – the faculties' externally-funded research engages with its natural constituencies.

The funding pattern at the disaggregated level of the departments provides a similar picture (see Figure 10 in Appendix A).

- The departments highly dependent on funding from Luxembourg are Economics and Management, Finance, Life Sciences and Medicine, Education and Social Work, Humanities, and Social Sciences

- Those with a high use of the EU Framework Programme are Computer Science, Mathematics, Engineering, Physics and Materials Science, Geography and Spatial Planning, and Social Sciences
- Education and Social Work and Social Sciences make limited use of FNR because they get the bulk of their funding from other parts of the public sector in Luxembourg, while Geography and Spatial planning does so because it gets the bulk of its external research funding from Europe

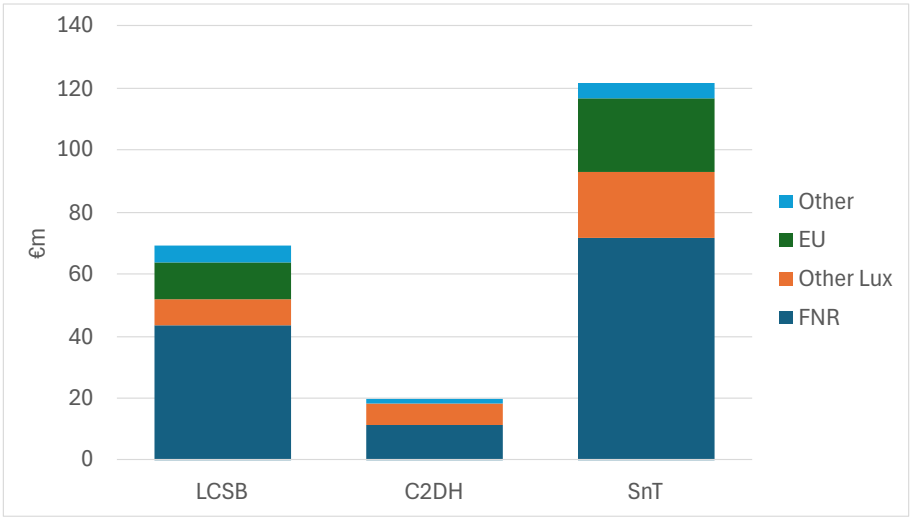
Figure 7 UL faculties' external research income, 2018-23



Source: UL data

Figure 8 shows the pattern of external research funding for the three Interdisciplinary Centres in scope to this evaluation. The Luxembourg Centre for Security and Trust (SnT) has the largest volume of external funding, making substantial use of FNR, other Luxembourg sources and the EU Framework Programme. It uses a lot of FNR collaborative research funding and accounts for two-thirds of UL's funding from Luxembourg industry, so it is uniquely embedded in the Luxembourg private sector compared with other parts of the university, while also obtaining substantial funding from the public sector. The Luxembourg Centre for Systems Biomedicine relies heavily on FNR and to a smaller degree on the Luxembourg public sector and the Framework Programme. As would be expected from its national mission, the more recently created Luxembourg Centre for Contemporary and Digital History has the lowest external funding volume, which comes mainly from FNR and third sector sources in Luxembourg.

Figure 8 ICs' external research income, 2018-23



Source: UL data

4.3 Human resources

The development of UL has been heavily based on international recruitment. As at December 2023, 15% of the 2550 staff were citizens of Luxembourg, with 60% coming from other EU countries (notably France, Germany, Belgium, Italy and Spain). Of the 301 full, associate and assistant professors, 17% were from Luxembourg and 73% from the rest of the EU. While the share of non-nationals in the staff and faculty in many European universities has risen in recent years, these numbers are much higher than elsewhere, in part because Luxembourg's population is small and in part because the rapid growth of the university necessitated reaching outside the national borders to find talent.

UL is in a better position regarding equality than many universities, having an almost equal gender balance among employees overall. UL's hierarchy has fewer women in the higher levels, with the notable exceptions that two of the four members of the rectorate are women, as are 50% of the members of the University Council. The university has established a mentorship programme for women researchers and in 2024 established an Office of Professorial Affairs in the central administration, part of whose responsibility is to seek a good gender balance among professorial-level candidates and recruits.

UL's research is highly dependent on the work of post-docs and PhD candidates, who significantly outnumber permanent employees. Table 3 shows UL's numbers of academic and administrative employees, post-docs and PhD candidates in 2023. Academic staff (see Table 3) comprised roughly one sixth of the total, and post-docs another sixth. PhD candidates and administrators each accounted for about a third of the total. Thus, there were about twice as many administrators as faculty members. The 478 (mostly) permanent researchers were very highly leveraged by three times as many post-docs and PhD candidates on time-limited contracts.

The total number of people grew 32% from 2198 to 2907 between 2018 and 2023, while the ratio of administrative and technical staff to others remained constant at 32% during the period.

Wages, the working environment, and conditions at UL appear to be very attractive, especially for established academics on indefinite contracts, among whom labour turnover is said to be

very low (4-5%). However, it was argued to several of the department and IC panels that professorial wages have not kept pace with international developments and are now less attractive than before.

Table 3 UL employees, postdocs and PhD candidates, 2023

Category	Headcount1	Headcount2	Percent1	Percent2
Overall total	**2907**		**100%**	
Total academic staff	478		16%	*100%*
Full professors		*162*		*34%*
Associate professors		*87*		*18%*
Assistant professors		*52*		*11%*
Senior lecturers		*8*		*2%*
Research scientists		*169*		*35%*
Postdocs	480		17%	
PhDs	1012		35%	
Total administrative and technical	937		32%	*100%*
Research support		*266*		*28%*
Teaching support		*78*		*8%*
General		*593*		*63%*

Source: UL Self-assessment report

The right to a sabbatical is limited to associate and full professors every seventh year – either as a six-month paid sabbatical at a university outside Luxembourg or as a 12-month visit on half pay. This is less generous than is the case in some other places, and as professors who specialise in Luxembourg law pointed out to its evaluation panel, is not especially useful to them.

Historically, UL has recruited to permanent positions by advertising internationally. While this has attracted many good people, it also made it very difficult for people in positions below full professor to be promoted. There is a bi- or tri-annual competition for internal promotions for which all faculty members can apply after 5 years, but with very few promotions offered each year, given a legally defined quota system. In recent years, the university has moved to modernise the career path for new hires, introducing a tenure track. However, this is limited to 48 months, so obtaining tenure is more difficult than in many universities with tenure track systems internationally. Promotions are also offered to people who win very large high-profile grants (ERC, FNR-ATTRACT). Post-docs can be promoted to research scientist if they win a major grant as a principal investigator.

The barrier to joining the permanent faculty is heightened by time limits on temporary contracts (5 years for research positions, 2 years for others). These build on EU legislation intended to prevent employers from denying workers the protection of full employment rights by keeping them on a succession of short-term contracts. At UL, this has the unintended consequence of making it extremely difficult to move from post-doc positions into permanent faculty jobs to retain promising people beyond these time limits.. The only formal route to do so is by applying for an open position.

Another legacy issue from growing a university out of earlier institutions is the category of 'research scientist', which comprises about one third of the faculty members (Table 3). These are teachers, researchers and technicians who support infrastructures and provide other services (e.g. support for writing grant applications) at the department level. Research scientists

are eligible to be promoted to assistant professor in the internal competitive promotion system, or if they win a substantial high-profile grant, though in practice few achieve such promotion because the law limits the proportion of in-house appointments of professors to 25% of all new professorships per year.. Nonetheless, many of them are seen as valuable colleagues, and UL continues to hire into this category.

Given the relative stability of the faculty staff population, professorial retirements offer important opportunities for changing direction and keeping research agendas current. Some 55 professors – almost 20% of the total – are expected to retire by 2030.

Professorial appointments are inherently slow, because positions first have to be negotiated all the way up from the departments to the university board, followed by a traditional recruitment panel process with three internal and three external members, after which the candidate must be approved at all levels up to the board. Evaluation site visits to departments and ICs showed there was considerable discontent, both with the length of time needed to effect a professorial appointment and a process by which the governing board was perceived as being able to intervene in academic appointments. Board intervention in academic appointments is highly unusual in other countries. However, it also seems that department strategies and plans tend to be unspecific about academic workforce planning, making it hard to take a strategic view at the level of the rectorate or to debate the relative virtues of filling vacant chairs or hiring at lower levels and then promoting, which could make it easier to make changes in research direction.

4.4 Research culture

The on-site interviews revealed both positive efforts and further room for improvement. For example, there is a clear focus on the still prevalent gender imbalance at academic career levels, which has been addressed through careful recruitment in recent years. On the other hand, there is a problem in terms of gender equality, as there are legislative limits (notably the 'five-year rule') to the university's ability to take child-rearing periods into account. The university campus as a whole is not family-friendly, and the expensive housing market exacerbates the difficulty of maintaining an inclusive HR policy. A bi-annual employee satisfaction survey of UL shows high overall satisfaction among academic and non-academic staff; the relationships and communication with colleagues were described as highly satisfactory. However, female members of the academic staff were significantly less satisfied with their work-life balance than their male colleagues.

The UL is member of the Luxembourg Association for Research Integrity (LARI) and has established an Ombuds service in 2021. Recently two full time positions were added to the initial part time Ombudsman. UL also offers mental health and counselling services. Despite these efforts, both the survey and interviews indicate that a considerable number of employees are unaware of support available from LU regarding mental and physical health or in conflict situations.

Interviewees said that UL put little focus on human resource and career development, regular appraisals, training plans, etc – possibly because the opportunities for career development have been limited. This contrasts with a very positive response regarding doctoral training and supervision, confirming the results of the UL survey.

5 UL in the national research and innovation system

How well organisations do their jobs depends not only on their internal efforts but also on their history as well as their context and the way they interact with it. This Chapter briefly describes that context and gives some examples of how other universities act in similar situations. The management of the challenges described here goes beyond the competence of the university and lies partly in the autonomy of the LIs and in particular in the responsibility of the MESR. Nevertheless, in view of the expected consolidation of the overall system, the specific roles and tasks of the various institutions must be taken into account. This applies in particular to the respective positioning of the ICs, which also have their own missions as a 'third format' within the university.

UL shares its 'space' in the national research and innovation system with the three Luxembourg Institutes[11] that were established (or whose predecessor organisations were established) long before the university. It is important to distinguish the LIs from basic research institutes such as CNRS in France, which increasingly 'cohabits' with the universities, Germany's Max Planck institutes, which do PI-initiated research focused on a particular institutional leader or facilities, or basic research institutes of Soviet-style academies of science, which, since the fall of the Soviet Union, have in many countries been absorbed into universities.

The LIs' missions are essentially to support national development in health (LIH), industry and the environment (LIST) and social policy (LISER). The absence of a university sector in their early history meant that the LIs needed to do more fundamental research than equivalent institutes in other countries that had already established a university sector. An obvious contrast is with Norway, for example, where the institute sector was largely established after the first two traditional universities (Oslo and Bergen), and is therefore much more focused on applied research and development than the LIs. A further complication in Luxembourg is that, by the time UL was established, many countries had extended their 'default' definition of a university from a largely Humboldtian model to include a 'third mission' of technology transfer or 'knowledge exchange'' with society.

Retrofitting a university into the Luxembourgish research and innovation system implied co-evolution between the institute and university sectors. According to the 2014 law on the CRPs, the LIs' mission is to do targeted fundamental and applied research to support research, development and innovation and to transfer knowledge and technology to the public and private sectors. Notwithstanding the fact that the formal missions of UL and the LIs overlap in that they address both fundamental and applied research and development as well as knowledge exchange or transfer, it would clearly be irrational for the university and the institutes to be in head-on competition. Internationally, research and higher education systems establish a division of labour in which the universities place greater emphasis on their research and education missions while applied institutes focus more on development and transfer. Well-performing systems bolster their performance through close cooperation, avoiding demarcation disputes.

- The Luxembourg Institute of Health (LIH) has a research portfolio that would be typical of many government public health labs. It does research on a short list of diseases, including cancers and neurodegenerative disorders that overlap with UL research interests, and has wider activities in translational research. It has the capability to run clinical trials, which is useful from a university perspective but is not something a university would want to do itself

[11] Formerly known as CRPs

- The Luxembourg Institute of Science and Technology (LIST) focuses on environment, IT and materials research, while also providing technical services such as IT services, testing, characterisation and certification. International analogues would include polytechnic research and technology organisations (RTOs) such as TNO in The Netherlands, VTT in Finland or SINTEF in Norway
- The Luxembourg Institute of Socio-Economic Research (LISER) does research on labour markets, living conditions and urban development and mobility. It does research and studies to inform policy in Luxembourg and neighbouring countries, as well as collecting data and maintaining socio-economic databases. Some university research interests such as migration overlap with those of LISER. Analogues abroad include the Netherlands Institute for Social Research and the GESIS Leibnitz Institute for the Social Sciences in Germany, both of which are government labs)

The economics of the LIs are very dependent on institutional ('block') funding (Table 4). 'Government labs' like LISER and LIH internationally tend to get a high proportion of their income from government, though practices vary as to whether this funding is provided as a single block or separated between institutional and project-based (sometimes competitive) funding. LIST's institutional funding is a much greater proportion of its income than is the case with other RTOs[12]. Such applied research institutes in the Scandinavia tend to get about 10-15% of their turnover from institutional funding. The 'continental' model (e.g. TNO, VTT, FhG, Tecnalia, AIT) is more generous with 30-40% institutional funding.

Table 4 Luxembourg Institutes' sources of funding

	LISER (2022)	LIH (2023)	LIST (2023)
Turnover	€24m	€63.5m	€90.3m
MESR institutional funding	61%	69%	62%
National competitive	12%	13%	20%
National collaboration	14%	12%	
International competitive	11%	6%	10%
Other	1%	–	1%

Source: Latest available annual or financial reports (downloaded 28 May 2025)

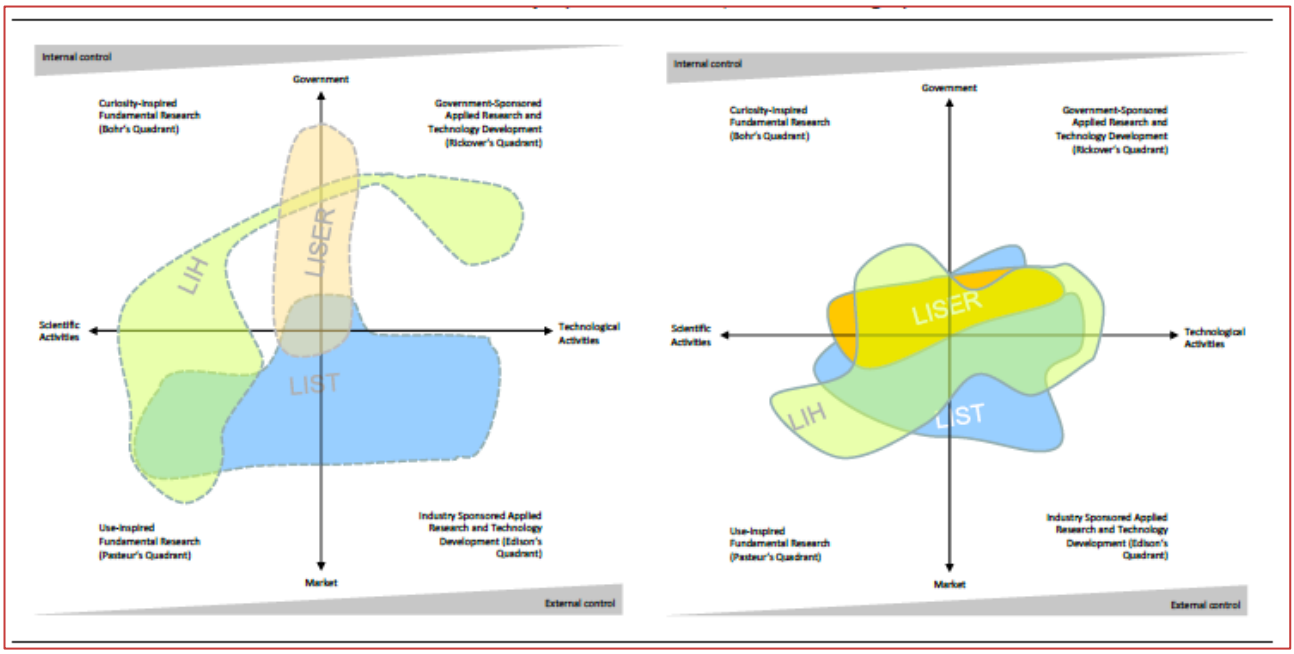
The latest (2023) evaluation of the LIs found that their work has increasingly converged towards the interface between fundamental and applied research but also that they were shifting towards more fundamental (especially problem-orientated) research (Figure 9). Unfortunately, the evaluators do not explain the analysis behind Figure 9. Our experience of studies and evaluations involving collaboration and division of labour at the boundaries between research, experimental development and development is that people working in fundamental areas tend to over-estimate the extent to which their work is applied and vice versa. Hence, we are a little sceptical about the absolute meaning of the distinctions made in the Figure. However, provided the method used in the two underlying studies was consistent, the trend of convergence towards the research-technology boundary is probably reliable.

The 2023 CRP evaluation more broadly found that the division of labour between LU and the LIs is largely appropriate, with the LISER cooperation functioning well. The cooperation with LIST was more problematic, with some departments cooperating well but with particular difficulties

[12] Both the 2023 and the 2019 evaluations of LIST made a similar observation, to the effect that LIST should be raising a bigger share of its income from external sources

in engineering and computer science, where research topics overlap and both institutions address contract research markets. The evaluation recommended closer cooperation between LU and LIH on teaching and staff career development. The implication is that the overall LU/LI division of labour works fairly well, but would benefit from better coordination, at least in engineering and computing.

Figure 9 Position of the Luxembourg Institutes in the research landscape, 2013 (left) and 2021 (right)



Source: Stefan Riedler, Balthasar, A, Haefelli, U, Grosjean, N, Büchler, C, Essig, S, and Thorshaug, K, (2023) *Synthesis Report on the Evaluation of the Centres de Recherche Publics (CRPs) in Luxembourg, Lucerne and Lausanne*

Universities and research institutes cohabit in most national research and innovation systems. There is a dearth of successful monocultures; cooperation seems to be the best mode. The level of cooperation in PhD supervision between the LIs and LU is impressive. According to UL's self-evaluation report, about 150 LI staff members have supervision rights at LU, and currently supervise some 170 of the roughly 1,000 registered PhD candidates. However, against that background, the number of affiliated professors[13] is disappointingly low. Currently, the LU web site[14] indicates there are six affiliated professors at the university: FDEF (2), FSTM (1), FHSE (3). Perhaps this is because, as the self-evaluation says, their administrative status is 'complex', suggesting there would be benefits from simplification.

In practice, UL cooperates at project level with the LIs. University/institute collaboration is business-as-usual in the EU Framework programme, and is encouraged at national level by the fact that FNR acts both as a research council and as an R&D-funding innovation agency, so national funding is available both for joint research projects and projects where the university, LIs and industry work together. Good examples of fruitful cooperation between universities and LI-style institutes include:

[13] According to the self-evaluation, this title is reserved to staff of the LIs affiliated to LU

[14] Accessed 29 May 2025

- Professors at the Norwegian University of Science and Technology (NTNU) established SINTEF in 1950 as a research and technology organisation to provide an outlet for their research, supporting technological development and innovation in industry
- The Royal Institute of Science and Technology in Stockholm (KTH) shares its campus with about 10 research institutes working on themes that overlap with those of the university
- Fraunhofer institute directors are obliged to hold a part-time professorial chair at a university (normally, one close to the institute)

In each case, there are many joint externally-funded projects where the two organisations play complementary roles; many members of the institutes have adjunct positions at the University, doing some teaching and thesis supervision; and many PhD students from the university do their practical work in the institutes' labs. The cooperation strengthens both parties without disturbing their respective business models, which are essentially incompatible. The LU/LI relationships seem to be well on the way towards such cooperative models, and it would appear useful to encourage yet closer cooperation.

6 Conclusions and recommendations

Our overall conclusion is that UL has made great progress since the 2016/7 evaluation, increasing its quality and impact, and refining its organisation and processes. Not unreasonably, there remain some areas that are capable of improvement in order to help the university transition from its growth phase into more of a steady state, within which it can nonetheless be dynamic in responding to changing scientific opportunities and societal needs. The focus of this evaluation and most of the areas needing attention are within the university itself. However, UL's performance is also dependent on the appropriateness of its governance and the shape of the research and higher education system within which it operates. We therefore end this chapter with the suggestion that the time seems to be right for MESR to review the governance and systemic role of UL and the LIs in the light of the substantial developments and changes that have occurred in the last two decades, since UL was created.

6.1 Conclusions and recommendations for the University of Luxembourg

Creating and growing a successful research university in two decades is a great achievement. The University of Luxembourg has been fortunate in having educational foundations and a dedicated campus on which to build, as well as generous resources from the Luxembourg government. Thanks to those, and the skills of dedicated and experienced leaders, teachers and researchers, UL punches well above its weight.

UL has marked its coming-of-age by appointing a rector from within the university for the first time, confirming what was already implicit in the 2018 University Law, namely that UL needs to move from its start-up phase when it recruited staff largely from outside the university to a more sustainable phase of educating and training more of its own people. This transition is in progress, but is by no means complete.

The government's aim in setting up the university was to support further economic and social development of Luxembourg as society becomes increasingly knowledge-based. Both education and high-quality research in the university and the LIs are needed to support the foreign and national investment necessary to keep Luxembourg business and society competitive and up-to-date. However, the Grand Duchy's population of some 625,000 is too small to support a large-scale, traditional, broad research university – especially in a context

where the majority of university students from Luxembourg study abroad. Rather, it implies a need to specialise both within teaching and research to be sustainable.

In teaching, this requires maintaining the number of academics and the diversity of knowledge needed to teach complete degree courses relevant to Luxembourgish society. While it is useful to adapt courses to local needs, the number of variations needs to be modest if teaching is to remain efficient and to leave enough time for academics also to do research.

In research, the effort needs to be focused on a limited number of areas where the university can build sufficient scale to establish and sustain comparative advantage and excellence. Some university systems address the need at the same time to be broad and to be specialised by locating individuals simultaneously within separate teaching and research hierarchies. UL has chosen to do so by establishing Interdisciplinary Research Centres, allowing academics to decide whether to work in a department, a centre, or both. Choosing to focus research in interdisciplinary centres tends to miss the point that there will also be a need to build intra-disciplinary scale and excellence in some places, which may not fit comfortably within disciplinary departments that focus mainly on teaching.

The generous institutional funding, research infrastructure, pay and conditions of UL provide researchers with an unusually good basis for doing good research and building careers. They are likely to provide strong incentives for PhD candidates and post-docs to perform, and the small number of opportunities available for tenure suggest that the competition among them will be cut-throat. The downside is that these same conditions can become a kind of 'gilded cage' for people on indefinite contracts, where the pressure for scientific entrepreneurship is low and they are to a degree shielded from the competition to win money from government and industrial funders.

Based on the evaluations of departments and ICs, as well as in-depth analysis and interviews with management and governance, we make five major recommendations.

1. Scale up research groups in selected areas

The high quality of much of the research at UL owes a great deal to the successful researchers the university has hired from elsewhere. One consequence of this hiring pattern is that UL's research effort is rather fragmented – not only in the faculties, where academics need to be both teachers and researchers but also in the ICs, where they can focus more on research. Correspondingly, it has proven difficult for the university to establish research groups that have critical mass, with a core of people together implementing a research agenda over time, and the ability to outlast the careers of their founders. Such group working is not necessary in all disciplines, but is increasingly important in the hard and soft sciences, which is why research funders internationally have increased the size of their grants and their funding for centres of excellence over the last 30 years or so.

Recommendations

- Encourage research entrepreneurship by enabling the formation of larger research groups or centres to de-fragment research, together with the more collegiate culture needed to sustain them. These can be in the ICs, the departments or the faculties according to need. They should be defined and championed bottom-up but in ways consistent and coordinated with UL's overall strategy and priorities
- Incentives to seek external funding should be increased, to make these groups self-sustaining, especially in terms of financing some of the research staff they need. These incentives should not be monetary but should relate to career development, teaching load, and participation in defining strategy

- Intensify efforts for greater participation in the EU Framework Programme and where possible in other international competitive research arrangements. This is needed to escape the confines of a small economy, understand global quality standards in research and industry, build academic and industrial networks, connect with global needs and technological opportunities, and access new money beyond what the Luxembourg authorities can provide
- Other opportunities for entrepreneurship include seeking more externally-funded chairs in areas of strategic interest and obtaining institutional funding from additional ministries with an interest in teaching and research to support their sector missions

2. Develop more strategic capacity at department and IC level

An important finding from this evaluation is that research strategies in the departments and ICs need more focus and at least a medium-term perspective to reduce fragmentation and develop internal and external recruitment and succession plans. While excellent recruitment and very good facilities were sufficient to ensure the quality of research activities during the university's growth phase, new challenges arise in the consolidation phase. There is currently a lack of structural incentives in the departments to seek external funding, and the small size of the departments reduces the likelihood of success.

As the rate of growth of the university reduces, it becomes increasingly necessary not only to start new things but also to consolidate or stop doing old ones – otherwise the university cannot change in line with developments in science and societal need. The old academic tradition of changing things only when professors retire makes universities inflexible and prevents them from adjusting to changes in science and societal needs in a timely manner. This is an additional reason for improving the consistency between departmental and IC strategies and strategy at the university level.

Recommendations

- Strengthen strategic capacity in the departments and ICs, allowing them to play a bigger role in defining the strategy of the university as a whole. This will help them develop and build on competitive advantages, identifying the research achievements and the human and research resources needed to take and sustain strong positions in their respective fields
- Produce more formal and documented research strategies that tackle both research and resource requirements (including human resources), are subject to critical review (in the faculties and by the rectorate), and are explicitly coordinated with the rectorate so that the university has a better perspective on the human and other resources it should expect to acquire and deploy
- The university in turn should be willing to set priorities for its investments in new activities, and to define 'stopping-rules' that enable it to change or shut things down, as well as to start them
- Ensure that teaching and research strategies are complementary. It is important to maintain scale in teaching as well as research, minimising the delivery of inefficient small-scale courses where these risk crowding out research
- Maintaining strategic capacity across the university also requires balance between the external governance of the university's interest in making sure it pursues its societal missions and the internal governance's pursuit of an autonomous academic logic. A careful balance needs also to be found in the internal leadership team and organisation between teaching and research

3. Improve human resources policies to support both internal careers and consistent external recruitment

While the 2018 University Law has in some respects made it easier to recruit, the legally-defined quotas for promotion impose a serious constraint on acquiring and developing human resources. There is always a need to recruit people from outside – which in Luxembourg mostly means from abroad – but internal career paths are also needed to create excellent research groups with sufficient scale to be sustainable. At present, UL has a legacy of people hired some years ago when all appointments were external and whose opportunities for success in the available promotion competitions are limited. It also has a small, newer generation of hires on a career path similar to a short-duration tenure track, in which assessment has to be complete within 48 months. Most PhDs and post-docs are subject to the '5-year rule' that limits the length of their employment on temporary contracts. These different paths need to be consolidated, and the university needs to be prepared and permitted to take a chance on moving exceptional people from temporary contracts onto indefinite ones if research groups are to become sustainable.

A further consideration is that scaling up requires a more collegial culture than exists at present. Grant-seeking, research training, mentorship and career development need to become more oriented to collective needs. Currently, the culture at UL is not particularly pressured, compared with successful universities elsewhere. Faculty members appear to see little potential gain from increasing student numbers, grant-seeking or publishing. Taken to extremes, such pressures can become perverse, but if coupled to the health and success of research groups, they can both help increase performance and group sustainability.

Recommendations

- Simplify, standardise and clarify research career paths, and devise a process for moving especially promising talents onto indefinite contracts to support the development of internal capacity
- Ensure that faculty member annual appraisals and promotion criteria are transparent, consistent across different groups of academics, and include criteria related to contributions to group, as well as individual, performance

4. Gender, inclusion and research culture

The university has taken strides in recent years towards increased gender equality among its employees. While this appears to have helped suppress overt discrimination, there is further to go. The university's decision to increase the staffing of the Ombuds Office is welcome, and should be evaluated after two years.

Recommendations

- Continue and intensify measures to reduce gender imbalance among UL employees, for example by reviewing the extent to which university policies make research environments family-friendly places to work, for example by addressing shortages of housing and child care facilities
- Seek to modify the '5-year rule' and the length of the tenure track so that they take account of parental and other compassionate leaves

5. Positioning in the research landscape, coherence with the Luxembourg Institutes

In addition to the possibility of supporting the missions of other ministries than MESR, referred to above, the university has two important opportunities in positioning in the Luxembourg research landscape.

One is to work more closely with the LIs. While it is tempting to view them as competitors to the university (which indeed they are in applying for FNR funding), as Chapter 0 of this report indicates, their societal roles and 'business models' are different from those of the university. The natural role of the university is to focus on more fundamental research than the LIs, whose focus is on supporting industry and government through applied research. International experience makes it clear that fostering the complementarity of these roles is a powerful way to support knowledge production and use for the benefit of science and society alike.

The other relates to the desire in government circles and parts of the university to have a medical faculty. Pursuing that question in any detail is well beyond the scope and resources of this evaluation, so this report can at best offer a high-level view based on the authors' international experience.

Recommendations

- The university should build further on its partnerships with the LIs to pursue more research opportunities, benefits from their applied skills and infrastructures, and benefit from their support in translational research and applications. This should be done at least through more joint or adjunct appointments, more project co-operation and continuing in practice together to arrange supervision of PhDs
- The desire to extend the university's activities in medical fields can be pursued if there are government ministries willing to bear the costs, but this aspiration needs to be realistic. Luxembourg and the university are too small to support a full-scale medical school, and Luxembourg in any case lacks the full-scale university hospital that would be needed. Nonetheless, it appears to make sense for UL to establish a faculty of medicine and health and explore niche opportunities, for example, in cancer and neurodegenerative diseases where it has skills that align with research needs in the public hospital and in LIH. These opportunities might eventually be extended through cross-border partnerships

6.2 Suggestions for MESR

In line with the terms of reference, this report focuses on the university. Yet it is impossible to ignore signals, on the one hand, that the governance and rules under which the university operates may no longer be in tune with its needs of a university in a consolidation phase, and, on the other, signs of discomfort about the complementarity of LU and the LIs within the state research and higher education system as a whole. We have not been able to assemble enough evidence to draw definite conclusions, but neither would we be comfortable to leave these issues unexplored.

Suggestions

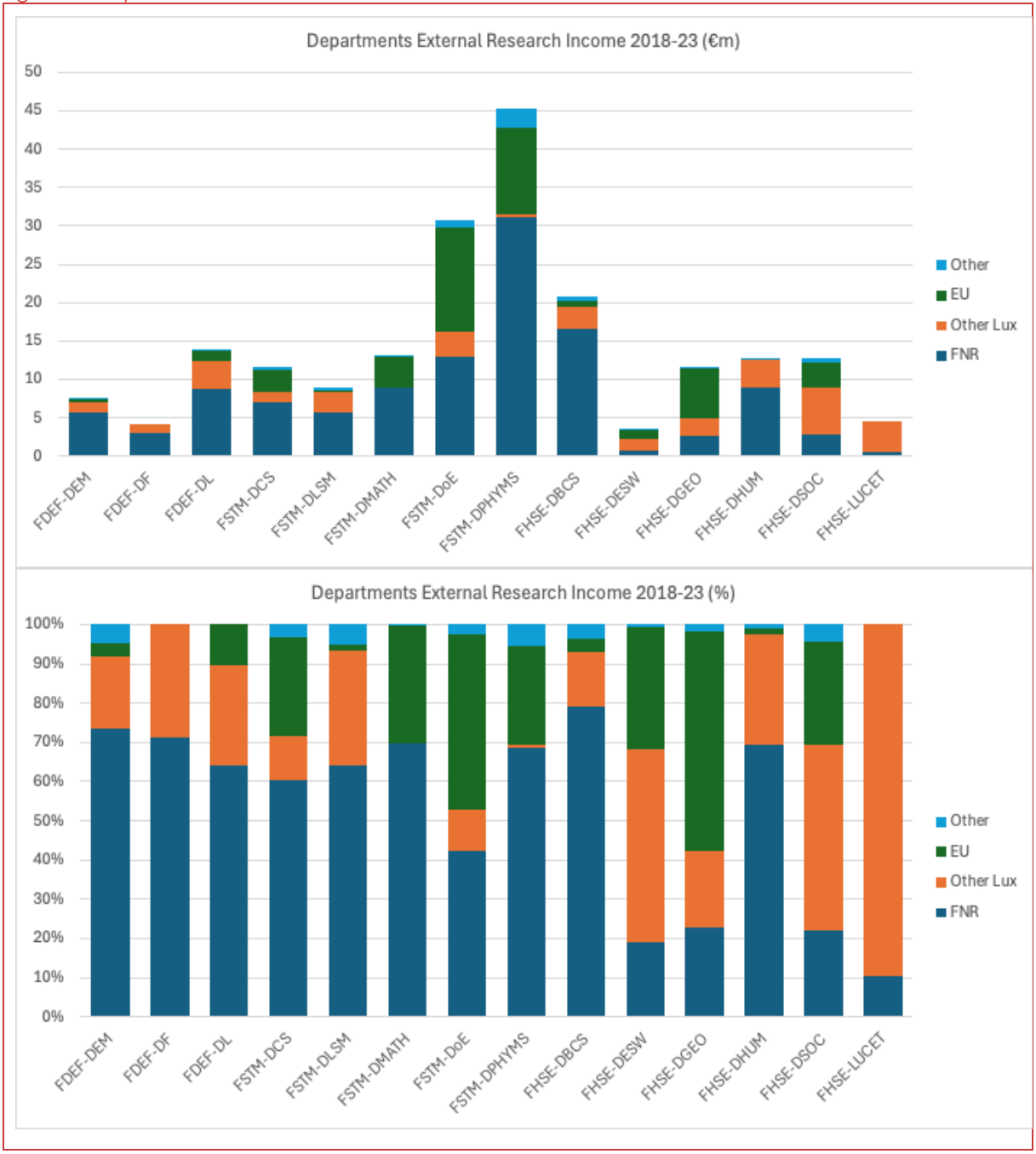
- The question of governance and internal rules involves inter-related elements, which need further exploration. The UL governance architecture was designed at a time when Luxembourgish government and society had little or no experience of governing universities. As a result, university law and the associated rules and practices maintain rather tight control of the university. Matters such as the number of faculties and ICs, HR management and promotion rules are codified in laws and rules, while in countries with longer experience of governing universities such matters are devolved to the organisations themselves. While the university board does not take operational or academic decisions, it

oversees and has power of approval of many maters that would elsewhere be devolved. While in the early days, this would rightly be seen as careful management, as the university matures it reduces the flexibility and agency of the university and its leadership. We suggest that MESR initiate a review to explore whether and how to improve further the university's performance by increasing its autonomy

- During the preparation of this report, we noted that: the university and the LIs are separately evaluated, but appear not to have been reviewed as a system; that the division of labour between the university and the LI applied research institutes appears less clear-cut than in many other countries; that LIST has a low proportion of external research funding compared with other RTOs internationally, suggesting a need to develop closer links to industrial customers; that the latest evaluation of the LIs identified overlaps between LIST and LU, especially in engineering. While there are important successes in terms of joint and complementary projects and PhD supervision between LU and the LIs, these observations imply there are opportunities for the four organisations concerned to work together as a more effective system for the public good. We therefore suggest that MESR review the organisations as a system, to identify opportunities to improve their effectiveness and efficiency in supporting scientific, social and economic development

Appendix A Departments' external research income

Figure 10 Departments' external research income 2018-23



Source: UL data

Appendix B Acronyms and abbreviations

C²DH	Interdisciplinary Centre for Contemporary and Digital History
DBCS	Department of Behavioural and Cognitive Sciences
DCS	Department of Computer Science
DEM	Department of Economics and Management
DESW	Department of Education and Social Work
DF	Department of Finance
DGEO	Department of Geography and Spatial Planning
DH	Department of Humanities
DL	Department of Law
DLSM	Department of Life Sciences and Medicine
DMATH	Department of Mathematics
DoE	Department of Engineering (FSTM)
DPhyMS	Department of Physics and Material Science
DSS	Department of Social Sciences
EU	European Union
FDEF	Faculty of Law, Economics and Finance
FHSE	Faculty of Humanities, Education and Social Sciences
FNR	National Research Fund
FSTM	Faculty of Science Technology and Medicine
FTE	Full-time equivalent
HR	Human resources
IAS	Institute for Advanced Studies
IC	Interdisciplinary Research Centre
KPI	Key performance indicator
LCEL	Luxembourg Centre for European Law
LCSB	Luxembourg Centre for Systems Biomedicine
LI	Luxembourg Institute
LIH	Luxembourg Institute for Health
LISER	Luxembourg Institute of Socio-Economic Research
LIST	Luxembourg Institute for Science and Technology
LUCET	Luxembourg Centre for Educational Testing
MESR	Ministry of Research and Higher Education
PI	Principal investigator
SnT	Interdisciplinary Centre for Security, Reliability and Trust
LUUL	University of Luxembourg
UniGR-Centre	UniGR-Centre for Border Studies

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