

Liverpool John Moores University

1. Context and Vision

History and Mission: Liverpool John Moores University's (LJMU) vision is to be recognised as a "modern civic university delivering solutions to the challenges of the 21st century". This holds true to our founding philosophy when in 1823 the Liverpool Mechanics' Institute and College of Arts, LJMU's forerunner, committed to education "as a positive lever for lasting social change". Research and knowledge exchange (RKE) is a core pillar of the University's strategic framework and means we have a clear focus on the creation, dissemination and translation of new knowledge. This enables LJMU to make a difference, change lives and impact local, national and international partners.

Size and Structure: In 2019/20, 23,900 students were studying at LJMU (Liverpool) with another 2,900 on LJMU programmes overseas. LJMU has five academic faculties (Arts, Professional and Social Sciences; Business and Law; Engineering and Technology; Health; Science), with 1,100 academic staff delivering a diverse taught undergraduate and postgraduate portfolio as well as supervising >700 postgraduate research (PGR) students. Dedicated RKE administration staff in Faculties as well as in professional service teams (Research and Innovation Services, Finance, Library Services, Leadership Development Foundation, n=60) provide further support.

Teaching, Research and Knowledge Exchange Balance: LJMU is a "large-sized" University with a mixed academic portfolio, where HESA-reported research grants, contract and quality-related (QR) income represent 7% (£15.7m) of total income. LJMU is committed to an inclusive RKE culture, that both informs and infuses our curriculum. The individual balance between teaching and RKE activity is determined by a mature workload allocation model.

Research Development, Maturity and Diversity (Disciplinary Spread): Heterogeneous RKE activity matches our curriculum portfolio. Sixteen units of assessment (UOAs) are submitted to REF2021 across all Main Panels (A: 20%; B: 30%; C: 34%; D: 16% staff). Our largest submissions are to UOA3 (72.4FTE) and UOA24 (63.25FTE). LJMU has participated in all "research assessments" since 1992 with substantial maturity in our "Institutes" and "Centres" (Table 1).

Reflecting an evolving research culture (identity, critical mass, environment), first-time submissions in "Psychology, Psychiatry & Neuroscience" and "Law" occurred in 2014. In 2021, two new UOAs "Earth Systems & Environmental Sciences (UOA7)" and "Business & Management Studies" (UOA17) demonstrate further expansion and maturity of our RKE portfolio. This reflects strategic investment and structural re-organisation (UOA7 incorporates FTE in biological anthropology, returned to the Anthropology UOA in 2008/14).

Table 1. LJMU: Areas of continuous RAE/REF submissions since 1992 with associated Research Institute and Centres.

Subject area	LJMU recognition of Institute or Centre (year)
Sport & Exercise Science	Research Institute for Sport & Exercise Sciences (1997)
Physics	Astrophysics Research Institute (1999)
Education	Centre for Educational Research (2004)
Architecture & Built Environment	Built Environment & Sustainable Technologies Research Institute (research centre since 2006; Institute status awarded 2010)
English Language & Literature	Literature & Cultural History Research Institute (research centre since 2006; Institute status awarded 2018)
Engineering	General Engineering Research Institute (2002); Research Centre for Electrical and Electronic Engineering (2007)
Art & Design	Institute of Art & Technology (Research Centre since 2011; Institute status awarded 2019)
Computer Science & Informatics	Research Centre for Critical Infrastructure Computer Technology & Protection (2011)

Local Context: LJMU is a key employer and educator within the Liverpool City Region (LCR), whose influence reaches the business, health, social and cultural fabric of the city. LJMU is embedded in the governance and activity of multiple regional bodies (e.g. LCR Combined Authority, Liverpool Health Partners, Innovation Agency) where collaborative RKE addresses local socio-economic issues, a historic skills gap and health inequalities (exemplar projects in sections 2 and 4). Our RKE “Beacons of Excellence” (Table 1) reflect Liverpool’s heritage as a global port, an international sport city and a world-renowned cultural hub, with collaborative partners as diverse as Shell UK Ltd, Liverpool Football Club and Tate Modern.

Affiliations and Peer Group: LJMU is an unaffiliated University, within TRAC Peer Group C and Knowledge Exchange Framework (KEF) Cluster E. Alignment is indicative of our size, breadth of our discipline portfolios across both STEM and non-STEM subjects, and generation of research funding from government bodies/hospitals and industry.

Summary: In REF2021 we have submitted 57% of eligible academic staff to sixteen UOAs. This reflects significant growth that is not solely due to changes in the REF framework but is attributed to cultural change and a strategy to grow RKE capability.

2. Strategy

2.1 LJMU Strategy for Research and Enabling Impact

Our [Strategic Plan](#) (2017-2022) committed LJMU to engage in “world-class RKE across disciplines” producing impact through “delivering solutions to the challenges of the 21st century”. Impactful RKE with translation arises from effective partnerships and evaluation of key

performance indicators (KPIs). Statements below reflect the Strategic Plan period, unless otherwise stated.

- 1) RKE is central to the development of all academic staff (KPI: increase in staff submitted to REF2021; increase number staff with PhD; increase total research outputs).
- 2) Support areas of world leading RKE (KPI: support growth in “Beacons of Excellence”; increase the number of Research Institutes or Centres).
- 3) Increase collaborations with key stakeholders to promote impact (KPI: increase RKE funding; grow collaborative research with overseas partners).
- 4) Grow and nurture our PGR community (KPI: increase PGR numbers; launch the Doctoral Academy).

2.1.1 RKE and Impact 2014-2020 (Achievement, Enablers)

KPI 1 Achievements: Positive trajectories in all KPIs reflect the continual development of a facilitative research culture at LJMU. REF staff submission guidelines have changed but we contend that our increased submission (REF2014: 256 headcount, 242.56FTE, 26%; REF2021 604 headcount, 583.56FTE, 57%) reflects a significant cultural shift. In addition, the proportion of staff with PhDs has increased (47% to 53%) in the last 4 years and annual research output production has increased from 1,217 (2017) to 1,457 (2020).

Enablers: Targeted recruitment of staff, with PhD and RKE activity as essential criteria, has supported cultural change. New staff have a three-year induction, protected research time allocation, mentorship schemes, resource support (seed corn funding), support for early career researchers (ECR; studentships, collaboration-development) and resources for interdisciplinary research across faculties (studentships). LJMU run an award-winning staff researcher development programme (“ACTivator”), a University-wide “Research Café” programme as well as being a signatory to the revised Researcher Development Concordat.

KPI 2 Achievements: We have world-leading Research Institutes in Sport and Exercise Sciences (12th/300+ in 2020 Shanghai Global Rankings in Sport Sciences, one of three from the UK in the top 50) and the Astrophysics Research Institute (two ERC Fellowships, two UKRI-Future Leadership Fellowships, 50% of outputs citations in the top 10% of journals). LJMU hosts a further 10 Research Institutes including three which have been awarded since 2014 (Research Institute for Literature and Cultural History; Institute of Art and Technology; Public Health Institute – which hosts the World Health Organisation Collaborating Centre for Violence Prevention).

Enablers: A strategic decision to support research excellence and broader cultural development has seen all core Quality-Related (QR) funding to LJMU returned to the faculty that “earned” it to cover staff and other research costs, such as capital developments and PGR recruitment. The University has committed significant resources to on-going “marquee” infrastructure plans, including support for a new robotic telescope (4.0m) run by the Astrophysics Research Institute based in the Canary Islands, and a new applied Sport Science facility in the heart of the city centre. Direct distribution of Research Capital Investment Fund (RCIF) to faculties supports investment.

KPI 3 Achievements: HESA-reported RKE income has grown by 13% to £10m at year-end 2019/20. Our RKE portfolio has partnership at the core of project development including, for example, a growing number of “Knowledge Transfer Partnerships” (Innovate UK). Collaborations with overseas partners have grown and a sector-leading 67% of outputs (2019/20) are co-authored with international partners (2019/20).

Enablers: LJMU is immersed in LCR governance (innovation and growth boards) and has collaborative partnerships with local, regional, national and international public and private enterprises. We support individual and group collaboration via staffing resources (Business Development Officers; Impact Officer), digital resources (“Living Walls”; impact tracker software) and financial resource (£250k per annum to impact projects; overseas collaborative “fellowships”; “Impact Awards”).

KPI 4 Achievements: Postgraduate student numbers have grown from 437 in 2013/14 to >700 in 2019/20 and completions have risen from 65 in 2013/14 to 149 in 2019/20. Importantly we have sought to increase the quality of student intakes and their experiences, through a range of internal funding and development schemes, employing enrolment windows and engaging in Doctoral Training Programmes (Applied Biosciences DTA; Cofund Scheme EU-Horizon2020 Ageing and Health).

Enablers: LJMU launched its Doctoral Academy (DA) in 2017 and an on-line PhD manager portal (eDoc) in 2019. We have reviewed regulatory policies, supported a new PGR development programme, and provided structured training for supervisors. LJMU has offered VC scholarships (138 since 2014), match-funded studentships with external partners (45 since 2014) as well as cross-faculty studentships for identified research priorities (Drone applications; Institute for Health Research). Recruitment has been bolstered by growth in Doctorate in Business Administration (DBA) numbers (16 in 2013/14; 46 in 2019/20) and 6 new Professional Doctorate programmes since 2013/14 (143 students 2019/20).

2.1.2 Strategic Research Plans for the next 5 Years (2021-2026)

Goal 1 Targets:

- a) Increase the proportion of research active staff from 57% to 62% (2026).
- b) Increase the proportion of staff with a PhD from 53% to 60% (2026).
- c) Increase the volume of research outputs from 1,500 per year to 1,600 (2026).

Enabler Plans: We will continue to prioritise RKE and PhD completion within recruitment processes, whilst developing materials to demonstrate research opportunities and support to potential candidates. We will retain the protected research allocation for new staff as well as other academic and financial support options. Where relevant we will support staff to undertake a PhD by publication with experienced mentors. We will extend internal award and reward (incentivisation) for staff engaged in RKE.

Goal 2 Targets:

- a) Confer 2 new Research Institutes before 2026.
- b) Increase output citation impact from 22% to 25% (top 10% citation percentiles) by 2026.

Enabler Plans: Targeted Research Centres will be supported to develop critical mass and key markers of success (outputs, funding, PGR completions), and attain Research Institute status.

Candidates include the Centre for Educational Research and the Centre for the Study of Crime, Criminalisation and Social Exclusion. We will recognise growing activity with external partners (Liverpool Centre for Cardiovascular Sciences) with formal affiliation. We will expand our staff development offer, including bespoke sessions for priority areas and targeted external stakeholders. In areas of excellence we will support applications for partnership-based Doctoral Training Programmes to grow critical mass, extend collaborations, promote interdisciplinarity, as well as acting as a stimulus to grow external grant submissions and produce excellent outputs. We will continue to support our “Beacons of Excellence” with strategic capital investment and non-pay resource support (e.g. QR distribution).

Goal 3 Targets:

- a) Increase total RKE income from £12.4m to £14m by 2026.
- b) Increase collaborative partnerships with routes to impact (develop KTP portfolio from 10 to 15) by 2026.
- c) Maintain sector-leading collaborative research outputs with overseas partners.

Enabler Plans: As a signatory to the UUK Knowledge Exchange Concordat we will focus on building capacity and impact. Targeted support for new and existing staff will promote interaction with regional/national organisations, business and funders via Knowledge Exchange Network activities (“Coffee and Croissant” online creative exchanges). The Liverpool Business School has significant recent success with Management KTPs. We will harness our regional assets such as Liverpool Knowledge Quarter to create collaborative opportunities and open new funding streams. Our strategic focus will be informed by local and national Industrial Plans, “Grand Challenges” or Innovation and Growth activity. We will provide resource for development of exceptional international collaborations (travel grants; ECR fellowships) with a plan for high-quality outputs and global grant capture.

Goal 4 Targets:

- a) Increase our PGR community from 739 to 900 by 2026.

Enabler Plans: Fully and match-funded LJMU scholarships will continue alongside a new, bespoke programme of support for external grant applications for PGR students requiring match-funding. A strategic focus will be partnership-based Doctoral Training Programmes via internal and external funding streams. The DA will refresh our PhD by Publication offer and extend the portfolio of Professional Doctorate programmes to develop collaboration with practice-based researchers. The recent addition of a PhD by Distance Learning will grow international activity as global digital communications and climate change agendas develop. There will be planned growth in Dual PhD programmes and Split Site awards with international collaborators.

2.2 LJMU Open Research Environment

The University’s Open Access (OA) Policy promotes ‘Green’ OA via our [publications repository](#) (2014). Library Services manage the workflow and the repository currently holds 11,052 items of which 1,423 are PhD theses (including all pre-2013 digitised LJMU theses from the British Library). Ninety percent of all repository items are not subject to publisher or author embargo and our thesis collection has had over 400,000 downloads. LJMU has an annual UKRI Open Access Block Grant allocation which supports article processing charges (including whole-cost

charges, e.g. IEEE and PLoS), institutional subscriptions to discounted publisher agreements, and has part-funded three OA monographs. In support of Plan S the University reviews all “*read and publish*” offers with agreements signed with Taylor and Francis, Cambridge University Press, Sage, Wiley, Springer, RSC, Portland Press, Microbiology Society, IOP and Company of Biologists. Library Services manage LJMUs data repository workflows (2017), deliver advocacy and training to promote open access to research data and support Data Management Plan preparation in any external grant application. The University’s Data Management Policy is underpinned by the [FAIR principles](#) and the UKRI Concordat on Open Research Data. To provide staff and PGRs first-hand experience of the publishing process, [LJMU Open Journals Service](#) was established (2016) using Open Journal Systems to support the end-to-end publishing process. This service supports home-grown LJMU journals including [PRISM](#) with 3,000 article downloads and 5,000 views since 2019.

2.3 Research Integrity and Governance

The application of the highest levels of research integrity are central to the LJMU Code of Practice for Research (updated 2020) and the Code of Practice for Alleged Misconduct in Research. LJMU acts in accordance with the revised Concordat to Support Research Integrity (2019). Standards and institutional expectations (e.g. ethics, data management) are included in routine training for staff and PGRs. No formal allegations or investigations of research misconduct have been conducted at LJMU since 2014. LJMU became a signatory to the San Francisco Declaration on Research Assessment (2019) to further promote good research practice. The University Research Ethics Committee (UREC) ensures all research involving human participants, or their data, safeguards the dignity, rights, health, safety and privacy of those involved. UREC handles 350-400 applications from staff and PGR per year. UREC includes staff from all academic areas conducting research on humans or their data, PGRs and individuals external to LJMU. UREC experience and expertise is regularly reviewed and annual training is provided. An online research ethics module is available for all and mandatory for PGRs. Staff and PGRs can attend research ethics workshops (ACTivator). LJMU sponsors research (20-30 per year) in accordance with the UK Policy Framework for Health and Social Care Research.

3. People

Staffing Strategy: LJMU attracts high quality staff, supports them to succeed and recognises their contribution. Recruitment emphasises completion of Doctoral level qualification and a strong RKE track-record. Just prior to, and at the beginning of the current REF period, LJMU ran an “INSPIRE” global recruitment drive that appointed 58 high-quality senior and ECR staff that provide leadership and promotes cultural change. On-going recruitment over the REF cycle has included support for strategic RKE areas. Additionally, LJMU has committed to the career pathway of staff holding prestigious, externally funded post-doctoral fellowships, via permanent academic appointment.

Support and development are vital to promote staff retention. New staff appointments have a protected research workload allocation (3 years) as well as a 3-year induction support

programme through the Leadership & Development Foundation that is supported by annual appraisal and research Group/Centre/Institute membership. Local resource has been provided by faculty ring-fenced PGR studentships for ECR. LJMU resource supports a “Research Upskilling and Coaching” programme (93 mentors and mentees 2018/20) and a “Collaborative Research Fellowship Scheme” (34 staff) to visit and develop work programmes with prestigious institutions (e.g. Harvard-Smithsonian Centre for Astrophysics).

Support for mid-career staff towards promotion and leadership roles is vital. Staff have access to training and development opportunities through LJMU’s award winning “ACTivator” programme (Staff Development Forum 2019 Developing Excellent Practice Award). Staff have amassed 1,100 registrations across 82 events since 2016. This constantly evolving programme covers activities such as successful funding strategies, stakeholder engagement, evidencing impact, media training, on-line engagement, public engagement and “writing retreats”.

LJMU is an established signatory (2013) to the Manifesto for Public Engagement, symbolising our robust links with the National Co-ordinating Centre for Public Engagement. The University engages with the Civic University Network (2020) and has formally signed up to the pledge “to form a Civic University Agreement”. The importance of “Place” in our strategic development will continue to refine, develop and optimise our strong cultural, arts, creative, economic and sports-based connections within the Liverpool City Region.

LJMU employs 124 research-only staff who are incorporated into research Groups/Centres/Institutes, undergo annual appraisal, and have access to training and development opportunities. LJMU became a signatory (2020) to the Revised Concordat to Support the Career Development of Researchers and we hold an HR Excellence in Research Award (since 2012).

LJMU’s staffing strategy includes recognition and reward. An annual LJMU RKE conference includes various awards with the highest accolade being the VC Medal for Research, provided to the individual, or group, demonstrating excellence in research. A VC medal for Knowledge Exchange (formally Economic and Social Engagement) is awarded for excellence in the translation of research. The University also awards an annual “Spotlight Award” (£20K) following a “Dragons Den” style bid and discussion process to pump primes exciting RKE ideas. LJMU proudly nominates exceptional staff or teams for external recognition; our Research Institute for Sport & Exercise Sciences received the TAFISA (International Sport for All Association) Mission Academia Award in 2019 for development of the Global Active City Programme (see REF5b UOA24). FaceLab (see REF5b UOA32) was awarded ‘Research Team of the Year’ 2019 in the Educate North Awards.

Institutional Support for Equality, Diversity & Inclusivity: LJMU support the belief that “each person is respected equally” and that “diversity is embraced”. We promote and celebrate diversity, and inclusive practices are embedded across the University. We continually review our internal EDI data to reflect on activity and identify key targets for change. LJMU has successfully renewed our Athena Swan Bronze Award (2018) with the University committed to making a Silver Award application and a Race Equality Charter application in July 2021. Internal

EDI data identified low numbers of female staff in senior RKE roles, reflecting historically lower levels of Readership and Professorship applications. Several positive actions have been supported at University level. Female staff are funded to participate in the Aurora Programme (64 since 2013/14). One staff member recalls “*Attending Aurora helped open my eyes to leadership opportunities and what ‘good’ leadership looked like*”. We exceeded EDI targets in the 2019/20 promotion round with 5 female Professorships conferred (5 applications) and 10 female Readerships conferred (21 applications). The Women’s Academic Network and sub-groups (Women Professors Network) provide bespoke support via mentorship, group-based training and development events, as well as advocacy with LJMU senior management. Internal EDI data analysis confirmed LJMU has limited representation of Black, Asian and Minority Ethnic (BAME) staff in RKE leadership positions (2; [EDI Annual Report 2019](#)). The launch of the BAME Staff Network (2018) provides career progression advice, mentoring and advocacy and has over 200 members (academic and professional services). LJMU launched a reciprocal mentoring programme (2020) with 10 BAME Staff participating, providing advice on career progression.

In line with our Code of Practice for Research (2014) individual staff circumstances have been taken into consideration during Reader and Professorial conferment. As detailed in the University’s Code of Practice for REF2021, a formal process for staff to declare personal circumstances that have adversely affected their ability to research productively over the REF cycle has been implemented. Seventy staff declared circumstances and the University has had output reduction requests accepted for three UOAs.

PGR Culture: Since 2014, 686 students have completed a PhD at LJMU. LJMU has expanded its Level 8 offer to include Dual (n=16, e.g. Bielefeld) and Split Site (n=12, e.g. Transart New York) awards, PhD by Distance, refreshed its PhD by Published Works for staff (n=14 since 2014), included a published paper format route option for PGR and a broad portfolio of Professional Doctorate Programmes (143 enrolled in 2019/20). The DA (2017) oversees governance as well as PGR and supervisor development. The DA launched eDoc (2019) an on-line PGR management software interface and provides a highly current, agile and popular Researcher Development Programme (RDP). RDP content is co-created with the PGR community, an approach that was commended by the QAA (2016; Good Practice case study “Enhancing the postgraduate student partnership”). In 2019/20 95 RDP events had 1,210 attendees, which represents a 40% increase in attendance since 2016/17. PGRs use eDoc to create their RDP training plans at the start of their doctorate that are synchronised with the PGR lifecycle (“Getting Started” to “Viva Survivor”). Since 2017 (114 PGRs) the DA has run “Thesis Boot Camps”, two-day intensive residential writing programmes for late-stage researchers with exceptionally positive feedback. The impact of the DA, RDP, and the vibrancy of the PGR culture was supported by the Postgraduate Research Student Survey (2019) with high satisfaction in research skills support (highest quartile) and professional development (5th out of 103 UK HEIs).

The DA manages PGR funding for external conference presentation (221 awards between 2014-2020, £60K), training bursaries (14 PGRs have attended a British Library Doctoral Study Day since 2016), an International Mobility Fund (2017/18; 22 PGRs to visit laboratories, artists,

attend training courses), “Brilliant Club” training (20 PGRs have delivered academic enrichment to 500 local key stage 3-5 pupils) as well as a bespoke training programme (3I’s: Information, Ideas and Insight) to support outreach and teaching. A co-created annual conference attracts c.130 delegates (50 posters/infoposters, 15 3-minute thesis finalists).

The DA promotes a community of practice for supervisors. The Dean of the DA is an Executive Secretary to the UK Council for Graduate Education (UKCGE). After participating in the pilot UKCGE supervisor recognition scheme, LJMU established annual University and faculty supervisor awards (2018). LJMU launched a “Developing Research Supervision” module, as part of an MA in Academic Practice (2018/19; 22 completions in 2018/19) and is now the route to gain supervisor accreditation at LJMU. A broader *Supervisor Development Programme* (2018) had 183 attendees in 2018/19.

Between 2017 and 2020, the DA was a partner in an international RDP (Erasmus Plus KA2 Strategic Partnerships: *TRANSPEER: A Transnational Project to Enhance Researcher Employability*) led by Karlstad University. A transnational skills training programme was developed and delivered for 36 researchers (10 LJMU) including PGR, supervisors, and DA staff. LJMU delivered a three-day training event for the full cohort on “personal and professional impact” [website](#).

4. Income, infrastructure, and facilities

Organisation: Operational governance of RKE is led by the University Research and Knowledge Exchange committee (URKEC). URKEC, chaired by the PVC-RKE, includes the Dean of the DA, Faculty Associate Deans for RKE, RIS staff (Research Excellence Manager, Grants and Projects Manager, KE Manager, Ethics and Governance Manager), Research Concordat Lead and other relevant staff as required. URKEC reports to the Executive Leadership Team (ELT), Academic Board and communicates to faculty committees. Governance focus includes research strategy development and monitoring, REF/KEF submissions, Concordat oversight as well as resource management, dispersal and monitoring.

Professional services teams (central and faculties) support RKE. RIS (22.9FTE) includes 4 teams. Grants and Projects (7.6FTE) and KE teams (10FTE) liaise with academic staff, finance and legal services to provide end-to-end project support as well as undertaking statutory and regulatory reporting requirements. Research Excellence (3FTE) collaborate with all REF UoAs (16), impact case study leads (56), finance, IT and library staff. Ethics and Governance (1.5FTE) run the institutional Ethics Committee (35 staff) and provide oversight for 14 School/Faculty Committees. The DA (6FTE) oversees PGR enrolment, progression and completion, runs the University Research Degrees Committee and RDP (10FTE, 10PGR) and links to Faculty committees. URKEC collaborates with IT through strategic initiatives and resource investment. IT implemented a move to online platforms (e.g. Grants and Projects Portal [GaP], 626 staff are trained and active; a PGR management programme [eDoc], 727 PGR and 664 staff are trained and active; Impact Tracker portal to capture the total impact journey; Symplectic Elements, the LJMU research information management system; Library-managed institutional repositories).

Investment in internal and external academic activity has focussed on strategically important areas. LJMU re-launched (2016) the Institute for Health Research (IHR), a pan-University group whose focus has been to support interdisciplinary RKE connections internally and with external stakeholders (Liverpool Health Partners, Academic Research Network Northwest Coast, NIHR studentships). LJMU was a launch partner (2018) to the Liverpool Centre for Cardiovascular Science and Liverpool Centre for Alcohol Research, that brings together clinicians and scientists from across Liverpool to provide cardiovascular health and alcohol-related health solutions for the local population. We engage with small-medium enterprises to develop and grow through collaborative research and innovation (e.g. KTPs). We co-invest in several European Structural and Investment Fund projects; working in partnership with local Universities and the Local Enterprise Partnership to provide targeted support to our growth sectors. Oversight of local RKE investment rests with the Strategic and Regional Projects and Programmes Panel (STAR) that reports to ELT. STAR has co-ordinated our engagement and contribution to key initiatives such as the Knowledge Quarter.

Resources: Over the REF cycle LJMU has committed £17.1m in strategic support of RKE activity (facilities, IT) and £321m for infrastructure and capital investment (buildings, refurbishments). Further, LJMU strategically devolves funding to support RKE across all faculties as well as providing focused central investment in a range of programmes. LJMU's combined QR income totalled £35.2m and this is dispersed to faculties to cover staffing appointments (INSPIRE posts) and a range of local strategic initiatives (e.g. capital spend, PGR studentships, consumables [e.g. "Technology Directorate Vouchers" £51K to provide access to unique University of Liverpool laboratories], ECR fellowships, staff development). Outcomes from this resource model are reported in unit-level statements (REF5b). URKEC and faculties have chosen to pump-prime strategic initiatives such as NIHR-linked PhD studentships and cross-faculty PhD studentships (Drone Technology and Applications). Since 2018, drone-related work has attracted £1.5m of competitively awarded external income (STFC, Leverhulme, UKRI GCRF). LJMU operates an "incentivization" process by apportioning 50% of the surplus/profit from externally funded RKE projects back to the faculties and staff. This allows local strategic resource investment (staff development, PGR recruitment).

LJMU directly resources schemes to increase PGR numbers. Since 2014 we have an annual VC PhD studentship competition with 138 full scholarships awarded to exceptional students (£6.5m). LJMU runs a "Match-funded" (50:50 resource split with external stakeholders) PGR studentship scheme (2014) with 45 awards resulting in external income (£1.3m), matched by LJMU. High profile partners have included Astrazeneca, the British Museum and Premier League football clubs. URKEC also supports bespoke match-funding requests as part of external grant applications (Research England: International Investment Initiative).

URKEC coordinates oversight, dispersal, delivery and evaluation for a range of other resources including LJMU's QR-Global Challenges Research Fund allocation (GCRF; £702k, 2017/20) with 64 projects in 28 official development assistance countries. These projects address important global health, social and economic issues. LJMU has utilised its Strategic Priorities Fund allocation (£126k, 2019/20) to accelerate interactions between researchers and external stakeholders in areas of important translation into policy (n=18). These were strategically

aligned with REF impact case study development. One exemplar case study highlighted how the funding was used to lobby Philippine government officials, charities, and non-governmental organisations regarding the plight of the islanders affected by raised tides following the Bohol earthquake in 2013. LJMU has received Higher Education Innovation Fund (HEIF) support across the REF cycle (£9.48m, including additional HEIF uplift grant 2017/18) and has distributed this to realise our RKE agenda (internal proof of concept funding schemes; patent/IP protection costs; dedicated RKE professional service team roles and activities). University-wide external grant capture is also managed by URKEC, including the MRC “Proximity to Discovery” funding (2017; £75k) for industry engagement projects between academics and life sciences business (e.g. proof-of-concept that New Zealand blackcurrant extract can improve glucose regulation and insulin sensitivity in overweight and obese individuals).

Infrastructure: Core facilities at LJMU include the “Life Sciences Building”, housed in the Faculty of Science (refurbished 2013/14, £8.5m). This comprises state-of-the-art laboratories for: molecular biology, genetic laboratories, imaging, chemistry, tissue and stem cell culture, hormone analysis, histology suite and an animal house. Four Research Support Officers are employed, with space supporting 150 researchers across 4 REF UOA (3, 4, 7, 24). The co-location of animal and human-based laboratories promotes interdisciplinary and mechanistic interrogation in areas ranging from sport and exercise science to conservation and biodiversity. In the Faculty of Health a new (2020; £13.7m) “Simulation Building” houses state-of-the-art facilities for research related to technical skill development but will also explore the ways in which health professionals make their decisions in three UoA (3, 4, 24). In the Faculty of Health, LJMU launched the Centre for Collaborative Innovation in Dementia as a European-accredited living-lab (2013), working directly with local citizens, SMEs, multinational companies, academics as well as commissioners and providers of services to co-create health related innovations and solutions. Since 2017 the Centre has attracted £1.09m funding and supported SMEs to co-create over twenty innovations and solutions. It has worked with the LCR health ecosystem to influence the content of the Local Industrial Strategy and to identify and disseminate good practice at a European level.

Opened in 2017, Sensor City, a £13m joint venture with the University of Liverpool, is one of four pilot BEIS University Enterprise Zones. Sensor City is a hub for researchers, SMEs, and the wider Sensor and IoT community; enabling industry and academic partners to translate novel and innovative sensor concepts into commercially viable solutions. Between July 2017 and December 2019 Sensor City delivered: occupancy for 24.4FTE researchers, 25 industry/academic collaborations and 43 business tenants. Independent evaluation of Sensor City (Technopolis 2018) concluded that customers value the academic connections provided, the community of sensor-interested stakeholders and access to state-of-the-art prototyping facilities.

LJMU holds over 50 unique and distinctive primary RKE sources in its “Archives and Special Collections”. Curated by Library Services, who also provide training, the collections range from nineteenth century fashion plates through to punk fanzines. The collections are there to inspire new academic work. In addition, the University hosts exhibitions, for example *Educational*

Pioneers, and seminars that relate to LJMU's collections. Library services also host and curate our on-line PhD repository as well as open access output and data repositories.