Institution: University College London (UCL)

Unit of Assessment: 17 (Business and Management Studies)

1. Unit context and structure, research and impact strategy

1.1 Context

The UCL submission for Business and Management Studies comprises the UCL School of Management, which was established during the current REF period in 2015. The creation of the School of Management marks a substantial investment in the area of Business and Management Studies at UCL. The investment included the opening of new facilities dedicated to the School in Canary Wharf in 2016, facilitated by an infrastructure investment of £20M from UCL's Capital Investment Programme, and a further investment of £30M to enable the School to expand and double its footprint in 2020. In addition, the School has undertaken a strategic recruitment drive to hire researchers from leading universities globally. The UCL REF submission in 2014 was made under the name of the Department of Management Science and Innovation, which has since been incorporated into the School of Management.

The UCL School of Management has a research portfolio spanning the full spectrum of business, management and finance domains, but differentiates itself from other business schools by focusing on the themes of *technology*, *innovation*, *analytics,* and *entrepreneurship*, studying the impact of technology, data, and artificial intelligence on the practice of management.

1.2 Structure

The UCL School of Management is organised around five research groups: (1) Strategy & Entrepreneurship, (2) Organisations & Innovation, (3) Marketing & Analytics, (4) Operations & Technology, and (5) Finance, Accounting & Economics. Each research group is led by a professor responsible for subject-level research activities, recruitment and mentorship. Other research support activities are organised at School level, including the annual recruitment of research assistants to support domain-level research activities. Research activities are coordinated by the Research Committee, chaired by the Director of Research, and comprising the School Director, and representatives of each of the groups.

The UCL School of Management is an integral part of a world-leading university and the main focal point for business and management research and education at UCL. The School has maximised the potential for collaboration with scholars across UCL in science, engineering, and social sciences. When the School was established, a strategic decision was made to focus its efforts on those areas of business and management studies that have the highest synergy and compatibility with the research strengths of other UCL departments, including Economics (e.g. in financial economics), Psychology (e.g. in business psychology), Computer Science (e.g. in artificial intelligence), Statistics (e.g. in data science), and Population Health Science (e.g. in healthcare management). The School's organisational situation within the Faculty of Engineering Sciences further creates opportunities for collaborative projects with researchers from engineering and computer science disciplines.

1.3 Research

The School's vision is to be a world-leading centre of research excellence, conducting theoretical, empirical and experimental analyses of managerial, organisational, and operational dynamics in innovation-intensive organisations. In keeping with UCL's tradition of interdisciplinarity and contribution to the public benefit (REF5a 2.1), the UCL School of Management aims to (1) create impactful research for the complex, interconnected world of the future, guided by the dual priorities of creating new knowledge and having a tangible impact on the key challenges facing businesses and other organisations worldwide; (2) educate the entrepreneurial business leaders of tomorrow, by re-imaging management education with programmes that are interdisciplinary and grounded in the latest thinking and research from mathematics, economics, engineering, and the social sciences; (3) help organisations succeed and change the world, by creating impactful and applied research, providing executive education and training graduates to help entrepreneurs, high-growth

and multinational businesses and policy makers succeed in a deeply complex, interconnected and data-driven world.

The Business and Management UoA at UCL has seen significant expansion during the REF period, exceeding the REF2014 objective to recruit an additional 20 researchers, expanding the department/school from 15 to 39 academics. In that same period, we have increased our research groups from two to five, each one linked the School's focus areas in entrepreneurship, innovation, analytics and technology. We have recruited leading academics from top universities such as Cambridge (Claus, Gladstone), Harvard (Doshi, Tsay, Fisher), MIT (Ching), Stanford (Thatchenkery), Berkeley (Liu), Northwestern (Yoon), Cornell (Krause), Duke (Deng), UCLA (Danbold), Carnegie Mellon (Korpeoglu, Singh), and London Business School (Lee, Malherbe).The School's research has also seen a significant expansion in that period, with the overall number of research outputs increasing by more than 300%, all of which have been made open-access.

Moving forward, the School will focus on growing each of the research groups in order to secure a critical number of researchers in each group. The goal is to enable a rich and diverse research environment, aiming to recruit another 20 faculty members and double the annual rate of research outputs. In the areas of finance and economics, the School closely collaborates with the UCL Department of Economics, for instance through joint appointments (e.g. Malherbe, Gorbenko, Yang), in order to foster interdisciplinary collaboration and research across the two units at UCL. The expectation is to make 2-3 joint appointments per year until a sustainable group of 12-15 academics is established.

The School aims to create a world-leading research environment through the following mechanisms:

- Recruitment of academic staff: The School is home to 39 scholars, recruited from leading universities around the world. The School's faculty is also global (67% from outside the UK and EU), and since its inception, very few faculty (5) have left the School.
- High quality and impact: A focus on high-impact research, published in top-tier international journals, with a focus on quality and global impact rather than mere quantity of research. Faculty are encouraged to focus on research that makes a substantial contribution in their field, without short-term targets for the number of publications. Faculty are given ample research time, at least 60% of their total time, with low teaching loads (60 contact hours per year), enabling dedicated periods of time for research, while education quality remains at the highest level.
- Strong research support: Academics have access to state-of-the-art research facilities (e.g. labs, high-performance computing), research funding provided by the School (£10-15k p.a. per researcher to support conference attendance etc.), and access to a pool of research assistants (typically PhD students from various London universities) to support their research.
- A vibrant interdisciplinary research culture: Academics frequently collaborate across research groups, and with academics in other UCL faculties, including engineering (e.g. on operations management), computer science (e.g. on artificial intelligence), psychology (e.g. on negotiation and decision making), economics (e.g. on contract theory) and the medical school (e.g. on access to health care and drug development processes). Each research group has a research seminar series in which renowned scholars and rising stars from around the world are invited, for instance Gans, Cachon, Allon, Netessine (Wharton), Simchi-Levi, Perakis, Carroll, Stern (MIT), Taylor (Berkeley), Ching (Johns Hopkins), Ghose (NYU), Tang (UCLA), Sudhir (Yale), Nair, Johari (Stanford), Misra (Chicago), Maglaras (Columbia), Lariviere (Northwestern), Bernstein (Duke), Ansari, Chick (INSEAD), Kavadias (Cambridge). Also, each research group has a weekly "reading group", where their research in progress is discussed.
- Comprehensive staff development: Colleagues are supported through all stages from lecturer to professor with mentoring by senior academics within and beyond the School through a global network of contacts. The success of the approach is demonstrated by the fact that all promotion cases put forward by the School have been successful.
- Wide engagement: The School's research is informed and developed by rich interactions with industrial sectors and policy makers, supported by the School's Deputy Director for Enterprise. An example of such collaborations is the School's research in the transportation area, with

major research projects with the UK Department for Transport, Network Rail, Heathrow Airport, and Eurocontrol.

Within the UCL School of Management, there is strong emphasis on developing and maintaining a culture of research integrity. Faculty members are first introduced to UCL's Statement on Research Integrity and Code of Conduct for Research during induction. Thereafter, faculty and PhD students participate in weekly reading groups in which working papers are shared and openly discussed with colleagues. These activities promote adherence to UCL's principles of research integrity that include honesty, rigor, transparency, and research ethics. In addition to the internal collaborative activities to promote research integrity, researchers are also encouraged to pre-register their studies and to present their work in progress at international conferences and at peer schools. In this way, by encouraging exposure of the ongoing research to experts in the field, the School promotes quality and the continued trust and confidence of the wider academic community. Within the School, all research projects, including those of students, are subjected to scrutiny concerning research ethics and the care and respect for human subjects. The School has recently set up an ethics committee for this purpose.

1.4 Impact

A core aim of the School is to help organisations succeed and change the world, by creating impactful and applied research, providing executive education and supporting entrepreneurs, high-growth businesses, and policy makers succeed in a deeply complex, interconnected and data-driven world. The School's impact strategy and activities are overseen by the Director of Enterprise. Each faculty member is given time in the School's workload model to engage in impact activities (at least 10%), which are discussed, agreed and appraised with the Head of relevant research group on an annual basis. Administrative and professional support is provided by the School's communications and marketing team as well as UCL Enterprise and Innovation. The School's approach to impact focuses on building relationships and maximising the benefits of its research for key user groups through:

(1) Transfer of specialist knowledge and expertise to practitioners, policy makers and the public, via:

- **Publications in practitioner journals, magazines, newspapers and social media.** The School's faculty are encouraged and incentivised through annual appraisal and promotional review processes to share research findings, not only through top-tier academic journals, but also through outlets directed at professionals. For example, Gladstone is a regular guest on BBC World News and his research has been profiled in The Wall Street Journal, Time Magazine, The Economist, and The New York Times; Tsay's research has featured in The Economist, Times, The Wall Street Journal, BBC, Forbes, Fox Business, Harvard Business Review, Huffington Post, Le Figaro, and Le Monde.

- **Conferences and events organised by the School** which provide a forum for staff engagement with practitioners and policy makers. For instance, Malherbe organised the 2018 the European Financial Intermediation Network Conference at the School.

- **Presentations and practitioner conferences.** Faculty are encouraged (with funding) to attend and contribute to practitioner and policy conferences, facilitating a dialogue with this important user group, such that they are able to ensure the on-going relevance and utility of their work to them. Examples include De Reyck's presentations at Eurocontrol Agency Research Team Workshop on Airport Capacity (Madrid, 2016) and at the Eurocontrol Airport Operations Team Workshop (Brussels, 2016), Kilduff's multiple contributions to the World Brand Summit practitioner conference, Tsay's presentations for the UK Department for International Trade, the International Federation of Red Cross and Red Crescent Societies, the United States Military Academy at West Point, the Curtis Institute of Music, the Children's Hospital of Philadelphia, and the Association of British Orchestras.

(2) Applied research and research collaborations

- Encouraging academics to work on problems that are directly relevant to business practice and in collaboration with industry partners is a key component of the School's approach to generating impact. The benefits of the School's work to for-profit and non-profit organisations

are typically achieved through applied research and consulting projects. Notable recent examples include (1) a project commissioned by the UK Department for Transport to improve forecasts of timelines and budgets of major UK infrastructure projects, resulting in the Department of Transport's "Transport Analysis Guidance" (www.dft.gov.uk/webtag/), (2) a project commissioned by Eurocontrol to improve the transfer passenger process and experience at Heathrow airport, resulting in a system currently in operation at Heathrow, (3) a collaborative research project with the Noble Group, a global supply chain manager of energy products, to optimize their transhipment operations in Asia, and (4) social entrepreneurship projects with UNICEF, Amnesty and Plan International for which Klaus was awarded Carolyn B Dexter Award in 2017.

- The School fosters impact-focused research at the earliest career stage, with graduate students being required to undertake projects that address organisation-specific problems, and a large number of graduate students undertake research while based within a host organisation. These placements also constitute an important channel for the development of the School's network of external partners and for the transfer of research expertise to those companies. Examples include Fragkos' work with the UK Department for Transport and Network Rail, and Guo's work with Heathrow Airport.

The submitted impact case studies underscore the centrality to the School's approach to impact of collaborative research projects with commercial organisations and policy makers; they demonstrate the potential that such collaborations offer to solve the School's partners' business and organisational challenges. For those case studies, key research findings were published in academic outlets as well as professional journals, and presented at practitioner conferences to increase the reach of their impacts by sharing relevant findings with a wide variety of organisations beyond those for which the new frameworks were developed.

2. People

2.1 Staffing strategy and staff development

Strategy. The composition of the School's academic staff is very international, with 87% non-British citizens or dual nationals. The School's staffing strategy consists of hiring distinguished scholars and promising early career academics from rigorous PhD programmes, and providing an environment that allows them to achieve their full potential in terms of producing research that is innovative and impactful. The School offers market-competitive salaries, which enables the recruitment of leading scholars in their field as well as promising junior faculty.

Composition. The School currently has 39 category-A academic staff members, a growth of 24 since the previous REF, and the strategic plan includes the provision to recruit 20 more academic staff over the next five years. In addition to academic staff, the School also has five research fellows (both internally and externally funded), who support the research projects of the academic faculty. Table 1 shows a breakdown of academic and research staff. Altogether 32 academics hold a fellowship of the Higher Education Academy, including education-focussed faculty.

Table 1. Staff (headcount)

	Age	<30	<40	<50	<60	>60	Male	Female	Total
Academic	Lecturer	1	17	4	1	0	17	6	23
	Associate Professor		4	6	0	1	8	3	11
	Professor		2	2		1	4	1	5
Research	Research Fellow		4	1			2	3	5
Total		1	27	13	1	2	31	13	44

Induction. New faculty members participate in a series of induction events and training through which the School communicates its approach and support for research, as well as its commitment to diversity and research integrity. Induction starts with a one-day event during which new faculty

members get to meet the School's Senior Management Team, their immediate line manager, and other relevant members of the School. The induction day is also an opportunity for new faculty to establish early connections across the School's five research groups. Other induction events are coordinated through a Moodle site which prompts new faculty members to sign up for training and important resources related to research integrity, EDI networks, and public engagement.

Appraisals and promotions. The School has a clear procedure for career development and a rigorous promotion review process for academic staff. The review process includes an interim review after 3 years and a promotion review that typically takes place at the end of the 6th year, although earlier promotion is possible. During this period, staff development and support is provided through annual appraisals with the Heads of the research groups, to agree on research targets, provide research guidance, identify potential areas of improvement, and to discuss other aspects that contribute to a successful research career, as well as teaching, enabling and knowledge exchange with the non-academic community. During the current REF reporting period, 8 academics were promoted to associate professor, and 2 to professor.

Teaching and Research Support. In order to achieve its vision of becoming a world leader for research and impact, the School limits the teaching load of its academic staff, with flexibility to concentrate teaching duties in order to create large blocks of uninterrupted research time. In addition, each member of academic staff is given an annual research budget (£10-15k p.a.) that enables them to attend international conferences and collaborate with researchers around the world. Academics are entitled to a one-term sabbatical after every three years. Moreover, faculty returning from maternity leave are given a term of study leave, and a 50% reduction in their normal teaching load for one year.

Support for early-career researchers. Academic staff in the first few years of their careers are assured that the development of their research careers is the first priority. This is made manifest in a number of ways: (a) a reduced teaching load during the first years, ensuring the transition to a full academic position does not interfere with their research momentum, (b) allocating start-up funds to set up a research activity, and (c) access to research assistants. Furthermore, the School allocates each new recruit an academic mentor to advise on all matters that affect their work from understanding local administrative procedures to taking a strategic view of their research goals.

2.2 Research students

Strategy. The School's PhD programme provides rigorous research training to highly motivated and talented students interested in pursuing an academic career as a faculty member in a leading business school. The programme is competitive with less than 5% out of 1,120 applicants securing a place during the REF reporting period, a total of 43 students. The intake will be gradually increased, in line with the recruitment of new academic staff. The programme consists of a one-year MRes programme, followed by a four-year PhD programme. A total of 10 students were awarded a degree during the REF period. The School's PhD strategy mirrors its overall research strategy focusing on high quality and high impact research. The PhD programme is therefore kept at a small size, ensuring that that each student receives personal attention and guidance from faculty members throughout their doctoral study, an essential foundation for a successful academic career.

Funding. The School views PhD students as an integral part of the research community and therefore offers fully funded scholarships and stipends to all of its students, including overseas students. The School's budget for doctoral scholarships was £885,000 in 2019-20, having increased from £320,000 in 2013-14. Students can also access School-provided funding to stay as visiting scholars in an overseas institution.

Support and supervision. The School views PhD students as an important investment to the viability and sustainability of the discipline and an integral part of the School's research community. Doctoral students are fully integrated in the School's research activities and culture. All the students are guided by at least two supervisors who have attended training provided by UCL Arena for research supervisors: Introduction to Research Supervision (16 supervisors), Effective Supervision (3 supervisors), and Examining Doctorates (6 supervisors). Students get further guidance on their research by submitting work to reading groups within their research groups, which are held weekly during term-time and attended by all academics. This process of peer-

review provides doctoral students with an excellent training in how to produce robust and high-quality research. Students not only receive feedback on their own work, but are also able to observe how the work of senior academics develops over time. Doctoral students are also given the opportunity to attend a wide range of research events, including seminars delivered by visiting academics, bi-annual School-wide meetings and social events organised by the School. Moreover, the School's new facilities in Canary Warf have been designed to foster interaction between students and academics within each research group. The doctoral students have a desk in an open area surrounded by the offices or their advisors and other academics from their research group.

Skills development. The School offers PhD students advanced training in research methods as well as in their subject area. Students are first enrolled into a one-year Masters of Research programme, which includes several advanced research-oriented postgraduate courses. Given the interdisciplinary nature of the research performed in the School, the PhD programme offers access to a wide variety of courses not just in the School itself, but also in other UCL departments (e.g., Economics and Psychology) and other London-based universities (e.g., London Business School and LSE). This arrangement gives the PhD students access to faculty in other UCL departments and London universities. Similarly, students from other UCL faculties and schools take PhD courses offered by the School. Additionally, students have access to a wide range of research and career training provided through the UCL Doctoral Skills Development Programme.

Research training is enhanced through further support provided by the School:

- Full funding to attend and present papers at prestigious international conferences, with students winning best paper awards at these conferences (e.g. in 2018, Lee was Winner of the Best Paper Award, MOC Division, Academy of Management and Guo was Winner of Winner of the 2018 INFORMS Decision Analysis Society Best Student Paper Award).
- Facilitation of a research stay of at least a semester, and up to a year, in a top global business school as a visiting scholar. Previous visits include the University of Chicago, Michigan University and Boston University. This initiative, fully funded by the School, ensures that PhD graduates are connected to top scholars globally as well as in the UK, which is important for ensuring their success as early-career lecturers.
- Interaction with industry to ensure real-life research impact. For instance, PhD students have worked with the Department for Transport, Network Rail, The UK Behavioural Insights Team, the Noble Group, and start-ups in London (e.g. nPlan) and Silicon Valley (e.g. Vungle).
- To have at least one paper in an advanced review round for a top journal before graduation. Students develop their publications with the guidance of their advisors and through participation to weekly reading groups in which they get feedback on their work. A manuscript is typically reviewed by a reading group multiple times before it is submitted for publication. Reading groups also provide support for dealing with the review and resubmission process with tenured academics having experience from publishing in particular target journals.

Student progress and support is monitored through an annual cycle of activities. Supervisors and students submit twice-yearly progress reports to the Director of the PhD programme. These are designed to ensure that any difficulties or specific needs can be identified and resolved at an early stage. In addition, all research students are required to record all key stages of their progress on UCL's online Research Student Log. The online log is designed to monitor each student's progress, but the log also helps to identify skill gaps and direct students to specific training courses.

Students discuss job search and market strategies with their supervisor(s) and typically identify a list of target universities based on the disciplinary area of the students' doctoral work and personal preferences. They also prepare an academic CV and a job presentation with the help of academics from the School. Students graduating during the current REF period have secured employment at the Robert H. Smith School of Business at the University of Maryland, ESSEC Business School, IE Business School, Rotterdam School of Management, University College Dublin, University of Bath, and the University of Warwick.

2.3. Equality and diversity

Values and organisational structure. Since its inception, the School has fostered equality and diversity in operating the School and providing support to academic staff. Since 2016, all staff have been required to take diversity training related to protected characteristics and on bullying and harassment. This training has included workshops such as "Where do you draw the line", "Taking the Lead", and "Ally". All research group leads who have been involved in REF preparations and assessment of outputs have attended this training. In addition, they have attended training provided at institutional level about unconscious bias with 100% completion rate. The School's senior management team includes three men and three women, and the team considers equality and diversity indicators on a regular basis (on recruitment, research performance, promotion, etc.), taking action when needed in alignment with the School's EDI action plan. In August 2019, the School institutionalized equality, diversity, and inclusion (EDI) values and policies by formally appointing a Director of EDI, setting up an EDI taskforce, and formally including EDI as a recurring item on the agenda of key school meetings and developing assessment tools to identify EDI issues and staff opinions (e.g. through bi-annual surveys, interviews and focus groups). The School is systematically including statements about diversity and equality on its job adverts, promotional material and communications. It also regularly reviews the visual diversity of its communication material ensuring that photos and graphs reflect the School's diverse staff and student body. In May 2020, the School was awarded Athena SWAN Bronze.

Staff composition. In 2020, among the Schools' academic staff, 26% are female and 46% identified as BAME. The Schools' analysis for its Athena Swan submission revealed some gender disparity in the past three-year recruitment and promotion data, and as a result the School has set target gender ratios to achieve by 2022 (30% female in Grade 10 - professor; 40% female in Grade 9 - associate professor). The relatively low proportion of women at full professor level is partially caused by a low number of female applicants for senior positions; for instance, in 2018/19, only 15% of applicants for professorial positions were female. When women have applied, however, they have been likelier to be shortlisted than men; in 2018/19, 50% of the shortlisted candidates were women. It has, however, been challenging to convince female candidates to accept an offer for a faculty position because other schools are also seeking to hire female talent to enhance their diversity, creating a very competitive environment. Therefore, the School has developed a plan to attract more female applications at professor level. This plan includes a creation of a network of international female scholars who are directly invited for research visits and job vacancies at the School. Moreover, the School will sponsor and host special events directed at female academics during major international academic conferences. In contrast to external recruitment, the School has been successful in promoting female academic staff internally; in the latest senior promotions round, 50% of professorial promotions were women, and in the entire REF period, 45% of all senior promotions were women. During the REF period, an equal number of successful senior promotion candidates identified as white and BME, which is in line with the proportion of white/BME staff in the School.

Supporting career progression. In terms of offering academics flexible working arrangements and leave (e.g., maternity, paternity, special leave), the School follows UCL's institutional policy but with room for extra support at the request of individual academics. The School provides for flexible working arrangements through planned remote working, flexitime, and requested timetable slots for teaching when possible. According to a 2017 survey, 89% of respondents (90% of all female respondents, 89% of all male respondents) agreed that they were able to use flexible work arrangements as long as they got the job done. A separate survey revealed that 70% of respondents noted that they had benefitted from School arrangements for flexible and/or remote working; 67% of respondents with caring responsibilities and/or ill health had had conference attendance or other necessary travel to support research facilitated by the School; 80% of respondents noted that equality and diversity considerations were taken into account with regard to support for funding and access to research resources; and 89% of respondents believed that the School had been supportive of their well-being. In alignment with institutional policy within UCL, female academics are given a term of study leave and a reduced teaching load when they return from maternity leave. The School is also encouraging male academics to use the opportunity to take shared parental leave by enhancing awareness of this possibility because

interviews conducted by the School's EDI team with male academics have revealed that they are not always aware of the university's parental leave provisions. Several male academics have now taken up shared parental leave.

REF submission. The School has paid due attention to equality and diversity issues during the construction of its REF submission. All researchers involved in REF preparations and assessment of outputs have attended UCL's REF EDI training. The REF review and selection group monitored equality issues on an ongoing basis, making adjustments where possible, for instance by prioritizing outputs deemed of equal quality based on EDI characteristics. The School's leadership also made it clear that the selection or non-selection of outputs would have no impact on the career development of the colleagues involved.

Looking at the School's REF submission, no significant gender disparities were found in both past and current REF submissions. In 2014, 100% of eligible (i.e., independent researcher) females and 85% of eligible males were submitted to the REF. In the current submission, 100% of both eligible male and female staff were submitted, as required by the new REF guidelines. In terms of submitted outputs, 23% of selected papers submitted were by female authors, more or less in line with the 26% proportion of female staff. There also was no strong evidence of gender disparity in terms of the number of outputs submitted per individual. Among the staff for whom four or five outputs were submitted, 25% were female, in line with the 26% proportion of female staff. Among the staff for whom only one output was submitted, 33% were female, slightly above the 26% proportion.

There are also no clear ethnicity-related disparities in the current REF submission. 100% of eligible BAME staff were submitted as per the REF regulations. 42% of selected outputs were submitted by BAME staff, more or less in line with the 46% proportion of BAME staff. Also, 42% of those who submitted four of five outputs have a BAME background. Among those who submitted one output, 47% have a BAME background.

Finally, no evidence could be found in the REF submission of disparities related to sexual orientation or disability. As per the REF rules, 100% of staff were submitted, including one declared LGBTQ+ and one declared disabled member of staff. The LGBTQ+ member of staff was submitted with five publications, and the member of staff with a declared disability was submitted with three publications.

3. Income, infrastructure and facilities

The School's income has increased substantially over the REF period from £10M pa in 2013/14 to almost £35M pa in 2019/20. Approximately 55% of the School's revenues is re-invested in the School, with the remainder contributing to central university expenses and investments (for instance in new physical space).

The School's research activities are partially funded through QR funding and grant income from research councils such as *ESRC* (e.g. Kilduff on the dynamics of distributed innovation; Kang on accountability, capacity and trust to improve learning outcomes), *EPSRC (e.g. Dave Chapman* on intelligent positioning in cities using GNSS and enhanced 3D mapping; Kang on a systems approach on causal and probabilistic approaches for complex transportation networks*), MRC Future Leaders Fellowships* scheme (e.g. Aristidou on examining new models of work and novel organizational forms emerging in partnerships between the public and third sectors), *Innovate UK* (e.g. Yoo and De Reyck on using AI to optimise supply chains; Jong on developing business models and value systems for new medicines), *Horizon 2020* (e.g. De Reyck on business process reengineering to improve European airport operations), the *National Institute for Health Research* (e.g. Jong), the *Technology Strategy Board* (e.g. De Reyck's BRITS project), and industry councils such as the *European Office of Aerospace Research and Development* (e.g. Kilduff on the effects of network perceptions on leadership effectiveness and the effect of enmity on social network perceptions). In addition, some of the School's tuition fee revenues (approx. £1.65M pa) are dedicated to supporting research (e.g. through providing PhD student funding, research assistants, hardware and software) and for providing each faculty member with an individual

research budget (£10k-£15k pa) for attending conferences, running research experiments, purchasing access to data sets, and acquiring research equipment.

The organisational infrastructure for supporting research and impact includes a structure of research related committees, research leadership roles, research assistants, professional services staff (e.g., to support writing and costing research bids, and to publicize and disseminate research findings), and IT support (e.g., to support high-performance computing needs).

In 2016, the School moved into its new premises in Canary Wharf, with state-of-the-art research and education facilities dedicated to the School, an investment of £20M. In 2020, the School expanded by doubling its footprint in Canary Wharf, a further investment of £30M by UCL.

4. Collaboration and contribution to the research base, economy and society

4.1. Arrangements to support research collaborations

The School's faculty collaborate closely with researchers around the world to ensure the global relevance and impact of their research. All academics in the School pursue research collaborations which are typically international in nature. Academics have co-authored with researchers from universities such as Harvard (Fisher, Thatchenkery, Tsay, De Reyck), Stanford (Thatchenkery), University of Pennsylvania (Fisher), Chicago (Zhang), Columbia (Gladstone), Duke (Deng), Northwestern (Gladstone), Carnegie Mellon (Korpeoglu), Michigan, UCLA (Gokpinar, Smith, Yoo), NYU (Ibrahim), INSEAD (Stan, Vanneste), Melbourne (De Reyck), London Business School (Harvey, Kilduff, Lee), and Cambridge (Klaus).

Research collaborations are facilitated by the School in three ways. First, the School hosts a series of research seminars where faculty members from other universities are invited to present their research, with speakers selected in order to explore and pursue research collaborations. The seminars are overseen by a committee and enabled by a budget to pay for the travel and accommodation expenses of the speakers. There are on average 2/3 seminars per week. Speakers have included faculty from a wide range of international schools from the US, Asia and Europe. Many publications included in the School's REF submission have emerged from the resulting collaborations. The School also provides funds to enable collaborations to bring research partners to the UK, e.g. Christopher Tang (UCLA) and Sergei Savin (Wharton).

Second, the School promotes and enables research stays in other institutions for both faculty members and research students. Such stays are facilitated by flexibility in teaching arrangements, sabbaticals, and a budget for paying for related expenses. Research stays have been pursued in a number of leading business schools globally (e.g. De Reyck at Harvard, Kang at Stanford, Ching at Columbia, Kilduff at Singapore Management University, Gokpinar at Georgia Tech, Ravasi at Copenhagen Business School, and Vanneste at the University of New South Wales). The success of the stays is demonstrated by the publications coming out of the research stays as included in the School's submission.

Finally, in line with UCL's Grand Challenges programme (REF5a 2.2.3), the School has pursued interdisciplinary research related to global health (e.g., Gladstone on financial planning predicting mortality), sustainable cities (e.g., De Reyck on airport and air traffic control management), cultural understanding (e.g., Claus on child marriage in Indonesia), human wellbeing (e.g., Ibrahim on modelling of health care systems), justice and equality (e.g., Tsay on biased evaluations in aesthetic competitions and Lee on gender differences in responses to competition in the workplace), and transformative technology (e.g., Deng on cyber security for the NHS and Forti on digital platforms for freelance labour).

4.2. Fostering relationships with research users, beneficiaries and audiences

Academics also collaborate with non-academic organisations on major research projects, including the Department for Transport, Network Rail, Transport for London, Eurocontrol, and the Noble Group. Relations with research users and other constituents are also fostered through the roles held by faculty on advisory groups and committees, e.g. Malherbe on the Academic Advisory Group, Bank of England's One Bank Research Steering Committee (OBRSC), and Rietveld's contributions to the Digital Markets Taskforce at the UK Competition and Markets Authority.

The School has its own marketing and communications team that works together with UCL Communications to disseminate research findings to relevant audiences. As a results, research by the School's academics has been covered in media outlets across the world including the UK (BBC, The Economist, The Times, The Financial Times), the US (The Wall Street Journal, The New York Times, TIME), France (Le Monde, Le Figaro), and Germany (Der Spiegel, Deutsche Welle, Die Presse, Die Welt).

4.3. Contributing to the sustainability of the discipline

All faculty members contribute to the sustainability of the discipline by reviewing for top academic journals and as members of editorial boards. Several faculty members are regularly recognised for their contribution through outstanding reviewer awards, e.g. Fisher for Academy of Management Journal and Organizational Behaviour, Harvey for Academy of Management Review and Journal of Organizational Behaviour, and Vanneste for Organization Science. Members of the department have acted as editors and associate editors on a variety of journals, including Administrative Science Quarterly (Kilduff), Academy of Management Journal (Kilduff), Management Science (Ibrahim), Operations Research (Ibrahim), Journal of Operations Management (Gokpinar), Manufacturing and Services Operations Management (Ibrahim), and Strategic Management Journal (Vanneste).

Faculty members also contribute to professional associations and conferences through a variety of roles from chairing conferences and disciplinary tracks, to serving on best paper committees, e.g. Rouba co-chairing the 2015 Young European Queueing Theory workshop and the 2018 Stochastic Modelling Conference, Kilduff chairing 2020 Organization and Management Theory Division of the Academy of Management Meeting.

Faculty members also serve on research grant committees, e.g. National Science Foundation (Kilduff), Swiss National Science Foundation (Kilduff), Flemish Fund for Scientific Research (De Reyck), and Academy of Finland Research Council (Tsay).

The influence and contribution of faculty has been recognised through prizes and awards. The School's early career researchers have had a particularly strong impact as acknowledged through international prizes, including the 2017 Forbes 30 under 30 (Gladstone), the 2018 Association for Psychological Science Rising Star Award (Tsay), the 2016 INFORMS TIMES Doctoral Dissertation Award Competition (Korpeoglu), the 2016 Academy of Management Conference Best Paper (Krause), the 2018 Wiley Blackwell Outstanding Dissertation Award (Thatchenkery). Senior faculty have also won several awards, e.g. Kilduff winning the 2015 Academy of Management Annals Best Paper Award, the 2018 Ihnatowycz Institute for Leadership Best Article Award, and the 2019 Academy of Management Best Symposium Award.

The School also collaborates with London Business School, Imperial College Business School, LSE and City University Business School to provide research training at the doctoral level. Each of the institutions hosts doctoral training courses attended by students from the other institutions.

Summary

The UCL School of Management has made significant progress since UCL's submission to REF 2014. £50M has been invested in new dedicated facilities for the School's research and education activities. The School's academic staff has grown above and beyond the targets set out in 2014, with its REF submission growing from 13 to 39, the establishment of five research groups, and the number of research outputs growing by 300%. The School's leadership intends to continue this growth during the next REF period, by hiring and developing more world-leading scholars and creating an environment that supports high-quality research with maximum impact, while maintaining research integrity, and with a firm eye on equality and diversity.