



QMI annual report

Outcome requested:	Finance and Investment Committee is asked to note the QMI annual report for 2021/22.
Executive Summary:	<p>Executive highlights</p> <ul style="list-style-type: none"> • Research commercialisation KPIs would rank QMUL's 2021/22 performance between 7th and 12th position out of 17 when compared to the 2020/21 performance of other universities within KEF's Cluster V, looking across a number of benchmarking criteria. • 4 new spinouts established: Aotomat Limited, Enterika Limited, Pragmatic Genomics Limited and VacV BioTherapeutics (UK) Limited • A portfolio of 26 active spinout companies with QMUL's aggregated shareholdings valued at over £3.5 million at the year end • 2 early stage QMUL spinout companies secured a combined £3.5 million of investment and 2 late stage spinouts raised £11m • £0.8m million raised from the disposal of shares in late stage companies (2020/21 £1m) • 29 new commercial agreements in the year (2020/21: 28) • £2,084k of licence income received (2020/21: £1,262k) • 71 new invention disclosures recorded and evaluated (2020/21: 116)
QMUL Strategy: strategic aim reference and sub-strategies [e.g., SA1.1]	Research and Innovation
Internal/External regulatory/statutory reference points:	Strategy 2030 UKRI
Strategic Risks:	Research Income Research Quality
Equality Impact Assessment:	N/A
Subject to prior and onward consideration by:	None
Confidential paper under FOIA/DPA	No
Timing:	Annual report to the Committee
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Date:	02/03/2023
Senior Management/External Sponsor	Professor Andrew Livingston, Vice-Principal (Research and Innovation)



Queen Mary Innovation Limited

Annual Research Commercialisation Report

2021/22

1. Executive Highlights

- Research commercialisation KPIs would rank QMUL's 2021/22 performance between 7th and 12th position out of 17 when compared to the 2020/21 performance of other universities within KEF's Cluster V, looking across a number of benchmarking criteria.
- 4 new spinouts established: Aotomat Limited, Enterika Limited, Pragmatic Genomics Limited and VacV BioTherapeutics (UK) Limited
- A portfolio of 26 active spinout companies with QMUL's aggregated shareholdings valued at over £3.5 million at the year end
- 2 early stage QMUL spinout companies secured a combined £3.5 million of investment and 2 late stage spinouts raised £11m
- £0.8m million raised from the disposal of shares in late stage companies (2020/21 £1m)
- 29 new commercial agreements in the year (2020/21: 28)
- £2,084k of licence income received (2020/21: £1,262k)
- 71 new invention disclosures recorded and evaluated (2020/21: 116)

2. Introduction

QMI's strategic goals are to deliver the *QMUL Strategy 2030* ambitions for the commercialisation of research. The *Strategy 2030* aims to embed a culture at Queen Mary where impact, innovation and engagement are an innate part of all research activity, to maximize its impact in order to enhance our global reputation. Specifically, for QMI, the aim is to become a UK leader in the measurable impact of licenses and spin-outs from our research community.

This year, and following additional investment from the University, QMI is beginning a series of new initiatives to more quickly achieve this aim:

- Invest in more posts across all disciplines to increase the throughput of commercialisation opportunities and enhance capacity to support researchers applying for translational funding
- Specifically include HSS in coverage to develop the use of commercial tools in scaling the impact of humanities social sciences research, including the creation of social enterprises.
- Support the new URIs developing precision healthcare and AI platforms that present increased commercialisation opportunities, including bolstering med-tech and regulatory capability through a closer working relationship with Barts Life Sciences
- Support a revised university IP policy that will incentivise and support faster company creation
- Develop an innovation communications capability to work with External Affairs and Business Development to enhance our telling of the stories of Queen Mary's innovation strengths and successes
- Increase the investment in patents, including maintaining patents for longer in order to ensure we make the most of life sciences and biotech opportunities which require a longer timescale

- Increase investment in a capable internal and external team to build companies, ensuring we capture early-stage value rather than relying too heavily on external venture builders who we would rather see as a last resort
- Consider how we maintain long term support for Queen Mary spinouts, including establishing a process for the use of pre-emption rights to maintain our shareholding in promising companies
- Building an enhanced investor network, raising the profile of Queen Mary Research and Innovation and raising more capital for spinouts; working with our peer universities in London to consider how we might raise funds together
- Consider ourselves as contributors to the wider ecosystem, including the Whitechapel Life Sciences district, to ensure we play our role in (and benefit from) a growing innovation ecosystem in the East End of London
- Contribute to the enhancement of the entrepreneurial ecosystem within and around the University, specifically by using QMI's skills to create an incubator for University start ups that do not include University intellectual property.

This report highlights the in-year commercial outputs relating to the performance of QMUL's spinout portfolio, licensing of technology to industry and development of the innovation pipeline to maximise long-term success.

Performance was benchmarked against a fixed set of UK HEIs that are within QMUL's direct peer group ("Cluster V") under the Knowledge Exchange Framework (KEF). HEIs in Cluster V are large, high research intensive and broad-discipline universities undertaking significant amounts of world-leading research in clinical medicine and STEM. The comparative data used is obtained from the most recent HE-Business and Community Interactions (HE-BCI) survey available (2020/21) against which QMUL's relative performance can be benchmarked. To guide the benchmarking, QMUL's research income for 2021/22 would rank 12th within Cluster V based on Research Grants and Contracts reported in the respective universities' 2020/21 financial statements.

2.1. Creating new QMUL Spinout Companies

Approach

QMI works closely with academic spinout founders, managing the spinout process from early invention discovery, evaluation, development, validation, business planning, financing and formation of the company. QMI seeks investment from venture capitalist, individuals and other funding bodies.

Performance

Spinouts created	2017/18	2018/19	2019/20	2020/21	2021/22
Target	1	1	1	2	2
Actual	1	2	2	3	4

Four new spinout companies were established in the year. The creation of spinouts is more labour intensive than licensing and targeting 2/3 spinouts a year aligns with resources and pipeline.

Aotomat Limited, formed by Professor Yang Hao [School of Electronic Engineering and Computer Science], designs electromagnetic devices.

Enterika Limited, formed by Dr Madusha Peiris [Blizard Institute], will produce appetite suppressing food supplements.

Pragmatic Genomics Limited, formed by Dr Yannick Wurm [School of Biological and Behavioural Sciences], a software company that analyses genomic data.

VacV BioTherapeutics (UK) Limited, formed by Professor Yaohe Wang [Barts Cancer Institute], is developing viral-based therapies for cancer.

Benchmarking

The following table set out the number of new spinouts created in 2020/21 for Cluster V HEIs and new spinouts created by QMUL in 2021/22. Our performance would rank joint 9th against the benchmarking data available for 2020/21.

Rank	University	No. of new spin outs
1	The University of Oxford	21
2	The University of Cambridge	14
3	Imperial College of Science, Technology and Medicine	13
4	The University of Manchester	13
5	The University of Sheffield	7
6	University College London	6
7	The University of Leeds	6
8	The University of Bristol	5
9	Queen Mary University of London	4
10	Newcastle University	4
11	University of Nottingham	4
12	The University of Birmingham	3
13	The University of Liverpool	1
14	The University of Southampton	1
15	The University of Warwick	1
16	King's College London	0
17	London Business School	0

A lack of access to early-stage investment capital is a hurdle for the creation of QMUL spinouts. An internal QMUL Investment Fund was created using spinout proceeds to lower this barrier by providing early-stage seed financing to future QMUL spinout companies. Any investment would be determined on: commercial validation through leveraged external funding; a fully costed plan with relevant milestones; and the likelihood of it being able to raise follow on investment/funding based on market analysis. During the year, Enterika Limited were the first recipient of investment from the fund.

2.2. QMUL Spinout Portfolio Management

Approach

QMI supports QMUL spinout companies by representing its shareholder interests on the boards of spinouts. After a spinout company has been formed, it is standard practice to appoint a QMI executive as a non-executive director who will remain involved during the early development of the spinout and update the QMI Board as necessary. QMI's involvement in the spinout usually diminishes after they receive Series A investment and/or QMUL's shareholding is diluted below 10%.

Performance

Spinout portfolio	2017/18	2018/19	2019/20	2020/21	2021/22
Actual	14	16	18	22	26
Spinout proceeds	2017/18	2018/19	2019/20	2020/21	2021/22
Actual (£'000)	-	263	-	1,007	764

The spinout portfolio at the end of 2021/22 consisted of 26 companies with QMUL's aggregated shareholdings valued at over £2.5 million.

Although the numbers of spinouts in the portfolio is not in itself an indication of quality or guaranteed downstream capital returns, QMUL's portfolio is smaller and less mature than comparators and a larger and more mature portfolio would provide QMUL with a greater chance of spinout successes over the long term. In order to generate impact and returns to QMUL it is focused on spinouts that have the most potential for high-growth and scalability.

Significant activities in the portfolio during 2021/22 include:

Actual Experience plc

The AIM listed company has recently changed its sales model following disappointment income number from being reliant on resellers to having a direct sales force. The software technology continues to be relevant, improve user experiences in the digital workplace, and a potential investment area for IT/HR in a hybrid workplace. The company raised another £3m in late 2022 to give the direct sale initiative a chance to succeed. QMUL has a 1% shareholder in the spinout.

VacV BioTherapeutic (UK) Limited

The company raised £2.5m of funding on incorporation to further develop cancer immunotherapies and its systematic delivery system using novel Vaccinia virus technology to target a range of cancers. The level of investment provides commercial validation of the world leading research carried out at QMUL.

The opportunities to realise value in non-listed QMUL spinout are limited, with a trade sale of the company's entire shareholding for cash the most likely route of exit. QMI has more control over the shares held in AIM-listed spinouts and will look to continue the sell-down of the shares held in listed spinouts to provide an annual return to QMUL and support more entrepreneurial activity, anticipating a growth in academic numbers in the coming years.

Benchmarking

The following table illustrate the returns to HEIs from the sale of shares in spinout companies in 2020/21.

Rank	University	Sale of shares in spin-offs (£' 000)
1	University College London	25,228
2	The University of Oxford	4,172
3	Imperial College of Science, Technology and Medicine	2,398
4	The University of Southampton	2,259
5	The University of Cambridge	2,142
6	The University of Leeds	1,816
7	Queen Mary University of London	764
8	The University of Bristol	220
9	University of Nottingham	155
10	Newcastle University	93
11	The University of Birmingham	52
12	The University of Manchester	0
13	The University of Sheffield	0
14	The University of Liverpool	0
15	The University of Warwick	0
16	King's College London	0
17	London Business School	0

Around a third of Universities in this cluster realised value from their spinout portfolio during 2020/21. QMI will focus its efforts to realise value in its listed investment annually and register a ranking position in this metric.

2.3. Technology Licensing

Approach

By volume of work, the most common route to commercialise IP is through licensing of IP rights to companies. This strategy is less resource-intensive than creating spinouts and has a higher probability of technologies getting to market by leveraging the existing business expertise and development and distribution channels of the partnering licensee. QMI utilises various industry channels and existing contacts to find partners seeking business solutions and opportunities offered by QMUL technologies.

Performance

Licensing performance is measured against (1) the number of new commercial agreements executed in the year and (2) the total license income received in the year:

Agreement numbers	2017/18	2018/19	2019/20	2020/21	2021/22
Target	35	35	35	35	29
Actual	27	25	27	28	29

License income	2017/18	2018/19	2019/20	2020/21	2021/22
Target (£,000)	550	550	670	930	977
Actual (£,000)	594	771	975	1,262	2,084

28 new technology agreements were signed in the year, comparable with 28 in the previous year. License income was £2.1m up from £1.3k in 2020/21. This is the first time over £2m of IP income has been received in a year. QMI assigned maturing patents to an existing licence holder for a one-off payment of £0.5m, licenced a diagnostic test for Rheumatoid Arthritis with a £0.3m signature payment and royalties of £1m.

QMI endeavours to obtain a meaningful signature payment from licensees, however given the early nature of QMUL IP this is not always possible. Increased license income in the near term will therefore come from mature licenses, that have delivered milestone payments and are producing regular recurring royalties, rather than by signing new licenses in year.

At present around 85% of the QMUL license portfolio are at the pre-milestone stage and ~10% generate royalties. Despite this ratio, royalties are expected to contribute the majority of licence income in the coming year.

Myriad Genetics Inc (early-stage pancreatic cancer diagnostic) continued to deliver large royalties and Dragonfly Technology Solution Ltd (Consumer predictive AI software) has made good progress to increase sales and thereby increase the royalties paid to QMUL. The royalties received from these licences will underpin IP income in the near term.

Benchmarking

Data isn't available on the annual licenses signed so the following tables shows the total number of agreements for each HEI instead.

Rank	University	Total No. of Agreements
1	The University of Cambridge	11,088
2	The University of Oxford	4,017
3	University College London	2,964
4	The University of Southampton	1,733
5	Imperial College of Science, Technology and Medicine	577
6	The University of Leeds	485
7	The University of Manchester	396
8	The University of Sheffield	380
9	University of Nottingham	265
10	The University of Bristol	257
11	The University of Birmingham	228
12	Queen Mary University of London	181
13	The University of Warwick	179
14	Newcastle University	158
15	King's College London	153
16	The University of Liverpool	58
17	London Business School	0

Rank	University	IP licence income
1	The University of Oxford	63,302
2	The University of Sheffield	33,203
3	The University of Cambridge	11,200
4	The University of Manchester	7,391
5	University College London	7,312
6	Imperial College of Science, Technology and Medicine	3,127
7	The University of Liverpool	2,875
8	Queen Mary University of London	2,084
9	King's College London	1,870
10	The University of Southampton	1,617
11	University of Nottingham	917
12	The University of Leeds	912
13	Newcastle University	774
14	The University of Bristol	634
15	The University of Birmingham	493
16	The University of Warwick	275
17	London Business School	52

The HE-BCI reported metric for license numbers is the total number of active IP commercialisation agreements in the portfolio. QMUL's ranking is similar to the previous year but the value of this benchmarking is limited due to the validity of the high values reported for this metric by some HEI and what they may reflect e.g. high volume non-exclusive licensing of teaching materials or apps. Consequently, these tables may not reflect the true scale of commercialisation of research innovations within these HEIs. For example, 2 of the top 4 ranking Universities for license numbers would rank bottom for IP License income per license.

QMUL's 2021/22 license income of £2,084k is the first time that £2m has been exceeded in a financial year and its ranking is similar to the previous year. A raise in this ranking would be driven by growth royalties rather than signature/milestone payment. There are a couple of licences that are showing growth but at present there are no indicators of exponential growth that would see QMUL shoot up the ranking. QMI will continue to find the most suitable partners for QMUL IP to improve the likelihood of the technology delivering future recurring royalty payments.

2.4. Building the IP Pipeline

Approach

Effective identification and management of new innovations across the breadth of QMUL's research base is important to ensure there is depth as well as quality in QMUL's IP pipeline that will drive a long-term increase in new licenses and spinout companies. In order to ensure a strong pipeline of commercial opportunities, QMI seeks out commercially promising ideas from across QMUL's research base. New inventions arising from research are identified and registered within QMI as an *invention disclosure*. QMI evaluates each invention disclosure, and those with the best chance of commercial success are progressed.

Performance

New Disclosures	2017/18	2018/19	2019/20	2020/21	2021/22
Target	120	120	110	104	104
Actual	105	94	116	116	71

A good pipeline remains essential for future commercial successes. QMI has a small team and during the year all of the members of the BioPharma team left QMI. These vacancies significantly impacted the team's ability to identify new disclosures. In early 2023 all vacancies in the BioPharma team will be filled and this should lead to a return to 100+ disclosures being recorded.

The internal Impact fund continues to be an important source to engage with new academics, and support them not only to commercialise but demonstrate wider impact of their work. The team continues to identify different ways to engage individuals that have not connected with QMI previously.

Benchmarking

Rank	University	Number of disclosures
1	The University of Oxford	307
2	The University of Cambridge	287
3	Imperial College of Science, Technology and Medicine	224
4	The University of Birmingham	202
5	University College London	166
6	The University of Bristol	95
7	University of Nottingham	86
8	The University of Leeds	81
9	The University of Manchester	80
10	The University of Southampton	72
11	Queen Mary University of London	71
12	King's College London	61
13	The University of Liverpool	60
14	The University of Warwick	44
15	The University of Sheffield	41
16	Newcastle University	33
17	London Business School	0

QMUL's historic performance in this metric has been strong but with a dip in 2021/22 due to staff vacancies. It's expected that QMI will return to 100+ disclosures now all positions have been filled but the opportunity to make improvements above this would be limited as QMI's focus will continue to be on the quality of new disclosures, their evaluation and long-term engagements with research teams, rather than target chasing for its own sake.