Evaluation of Innovation Loans

Final Interim Report to Innovate UK

September 2019

SQW

Contents

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Executive Summary

Introduction

1. In the 2015 Spending Review it was announced that the UK Government would introduce new finance products to support innovation. Innovate UK worked with the Department for Business, Energy and Industrial Strategy (BEIS) and other partners to develop a new repayable finance product – innovation loans – with the objective of bridging the funding gap for innovative businesses whilst also providing value for money for the taxpayer. Government funded loans for innovation are new to the UK and the Innovate UK pilot is running over two years across financial years 2018/19 and 2019/20. A total of up to £50 million was available for business innovation projects, with UK small or medium-sized enterprises (SMEs) able to borrow between £100,000 and £1 million. In 2019, the pilot was extended with £25m additional funding.

2. The innovation loans pilot programme is delivered by Innovate UK and this evaluation covers five competitions for applications delivered sequentially, commencing in November 2017. These were sector specific competitions (Infrastructure Systems, and Manufacturing & Materials Readiness) as well as three open competitions. The loans are for SMEs that want to scale up by developing new or improved products, processes or services through for late-stage research and development (R&D) projects that have a clear route to commercialisation.

Overall conclusions

3. The evaluation draws on evidence from telephone interviews with 38 businesses (including 10 as case studies) that received an innovation loan. The interviews covered all five competitions. This was 70% of those that had started to draw down the loan at the time of the interviews (June and July 2019), and represents 56% of the total of 69 businesses that have signed a loan agreement. We also undertook telephone interviews with 78 unsuccessful businesses.

4. **At this interim stage, we conclude that the innovation loans pilot has been very successful**. From both the telephone survey and our case study discussions with businesses there is no doubt that it provides much needed finance for innovation, filling a gap in the funding landscape. **In delivery, Innovate UK has built up good relationships and the support is highly valued, reflected in the levels of satisfaction reported by the businesses. The customer journey, including the application process, is well structured, clear and transparent**. Businesses understood what was expected of them at each stage and generally valued the prompt decision making.

5. Communication and bespoke support from the innovation loans team is considered to be more responsive than from private sector and other grant funding programmes. Businesses referenced "support that [went] beyond just lending money" and described Innovate UK staff as knowledgeable, helpful and "[wanting] to see the project succeed…you don't get that proactive attitude in the private sector – it's refreshing".

6. The evidence from businesses is that they could not get this funding, for this purpose, from any other sources (95%) and that the loans have subsequently accelerated and/or scaled up projects in a way that would not have been possible otherwise. The loans have also been important in helping businesses secure a significant amount of follow-on funding, increasing R&D investment and creating high value research jobs.

7. The scale of the economic impact (and value for money) will ultimately depend on the extent to which this pipeline of investment converts into new sales and GVA. At this stage, we would say that the results are very encouraging, and the follow-on investment gives confidence about the prospects of significant financial returns. This equity funding also brings the commercial expertise of the investor, further enhancing the chances of success for businesses.

8. The Business Case (2017) for the pilot estimated a probability of default, based on historic proxy data, of 59% (as a central case). The actual pilot portfolio has a default probability ranging from 19% to 25% (central case). More information will be obtained over time as borrowers operate their loans and succeed or fail as businesses. According to Innovate UK, no defaults had occurred to date.

9. There are three areas that should be considered further as the pilot is developed. These are around how the loans can broaden their reach (particularly geographically and for more established innovative businesses), how to strengthen integration between innovation loans and other Innovate UK funding, and the importance of monitoring demand following the change in interest rate.

Evaluation objectives

10. The overall objective of the interim evaluation is to assess the delivery of innovation loans using a formative (i.e. process) approach and to make an early assessment of progress towards intended outputs and outcomes. In doing so, it provides the opportunity to evolve and refine the policy and its implementation for scaling up/wider roll out. Specifically, the interim evaluation seeks to answer the five evaluation questions:

Table 1: Interim evaluation questions

1.	What is the interest in, and demand for, the pilot products?
2.	What is the nature of the businesses applying, and the projects which form the focus of the applications for funding?
3.	What would have happened to the innovation projects supported if they had not been offered these loan contracts?
4.	How effective are the processes of implementation and what are the experiences of the customer journey?
5.	What evidence is there of progress towards the achievement of intended outputs, outcomes and impacts?

Source: Study Specification (2017)

11. We completed the following main research tasks as of August 2019:

- an early review of businesses that had initially shown interest in innovation loans but did not make an application – two online surveys and two papers with findings from them (see below)

- early review of the delivery process – interviews with Innovate UK officials involved in implementation of the pilot: programme leads, representatives from application assessment team, credit assessment, and monitoring officers (see Annex A)
- telephone interviews with 38 successful businesses including 10 as case studies (initial and follow-up case study interviews)
- telephone interviews with 78 unsuccessful businesses
- review of programme documentation and monitoring data.

Interest and demand for innovation loans (Section 4)

12. **Interest in, and demand for, innovation loans has been satisfactory overall**. The pilot received 393 applications seeking £200m in funding, representing four times the capital available for commitment. However, demand in the first two competitions was slower than anticipated. These initial competitions were quite niche in scope. The pilot has learned from this and the later, open competitions, have attracted greater demand.

13. The fifth competition received more than double the number of applications than the first. The pilot programme aims to deliver a target of 100 loans, worth up to £50m, over a two-year period (by spring 2019). To date 73 offers have been made and, of these, 69 loan agreements have been signed. The open competitions have made a big difference. The average loan value is nearly £700k compared to £500k estimated in the Business Case (2017).

14. The applications covered a range of projects from artificial intelligence, internet of things to advanced robotics. The most common project areas were process and manufacturing design technology; smart infrastructure; electronics, sensors and photonics; and energy efficiency. In terms of geography, London, South East, East of England, and North West, made up nearly 70% of the applicants and are the recipients of c. 60% of the loans. In terms of loan agreements signed, the top four regions were: Greater London, South West, South East and North West.

15. Two early review surveys of non-applicants provided feedback on why businesses registered but did not apply. This highlighted several issues in the early rounds which have been addressed in the later open competitions. Some of these related to building a better understanding of the pilot, such as who should apply and what assessors are looking for.

Assessment of delivery (Section 5)

16. **Overall, the delivery of innovation loans has been good**. There are clear and well defined organisational structures and arrangements in place to implement the pilot programme. The structures, roles, responsibilities and reporting of the Innovate UK delivery team are generally appropriate and fit-for-purpose. The process appears to be working better with each competition call.

17. The businesses interviewed provided positive feedback on the customer journey (marketing, application and agreement, and loan drawdown). A clear majority of businesses also considered the delivery of innovation loans to be good or very good in comparison with private sector finance providers.

18. The main reasons for selecting an innovation loan were: attractive terms and conditions, lower overall cost, the patient payback period and retention of ownership. Businesses felt that compared to other sources, the loans had a greater appetite for risk and a willingness to support firms that traditionally were not able to get finance elsewhere.

Assessment of early outputs and outcomes (Section 6)

19. The business survey covers all five competitions and is reasonably representative of the population of 69 businesses, although it under-represents the fifth open round competition. The total of 38 interviews was 70% of the available sample at the time and 56% of all the businesses that have signed loan agreements.

20. **Nearly all the businesses heard about innovation loans directly from Innovate UK (81%),** primarily through mailing lists and events. More than half (58%) had used the loan to recruit or train staff, while just less than half (42%) had used the funds to acquire capital equipment/vehicles.

21. At the time of application, 15 of the businesses (39%) had also applied for other sources of funding. Of these, 11 had sought equity (not necessarily as a substitute for the innovation loan), while the remainder had applied for other grants and commercial loans (including peer to peer lending).

22. The results of the case studies and survey demonstrate that the loans are filling an important gap in the market. The survey found that 95% of the businesses would not have been able to access this type of finance, for this purpose, without the award (finance additionality).

23. It is still early to report on outputs and outcomes given that the funding is still being drawn down, but there is evidence of businesses progressing projects towards commercialisation:

- **New products, services, and processes** – almost a third (12) of the businesses had introduced a new or improved product, service or process (six have introduced new or improved processes). The remainder expected to do so in the future. The majority of businesses planned to produce products or services that will be new to the market.
- **Moving towards commercialisation/ progression through TRLs** – 29 businesses (76%) had already progressed a product/service towards commercialisation; 11 of the businesses had moved their project from validation and testing to scaling; and four businesses had moved from proof of concept to validation/testing (Figure 1).

Figure 1: Moving towards commercialisation – how businesses have progressed any products/services towards commercialisation as a result of the innovation loan to date

Start TRL	Latest TRL: Developing **basic principles** or formulating the concept	Developing the **proof of concept** or testing in laboratory conditions	Being **validated or tested** in a real but controlled environment	Being tested and **scaled** in an operational environment	Fully **commercialised** and brought to market
Developing **basic principles** or formulating the concept	1	3	3	2	0
Developing the **proof of concept** or testing in laboratory conditions	0	1	4	1	1
Being **validated or tested** in a real but controlled environment	0	0	1	11	0
Being tested and **scaled** in an operational environment	0	0	0	3	1
Fully **commercialised** and brought to market	0	0	0	0	0
Base	1	4	8	17	2

Source SQW/BMG survey – base of 32 that responded to the question. Note: the matrix shows the starting TRL on the left and the TRL at the time of the interview across the top. It shows the combinations of the starting and latest positions. The figures in each cell represent the number of businesses progressing from starting TRL to TRL at the time of interview.

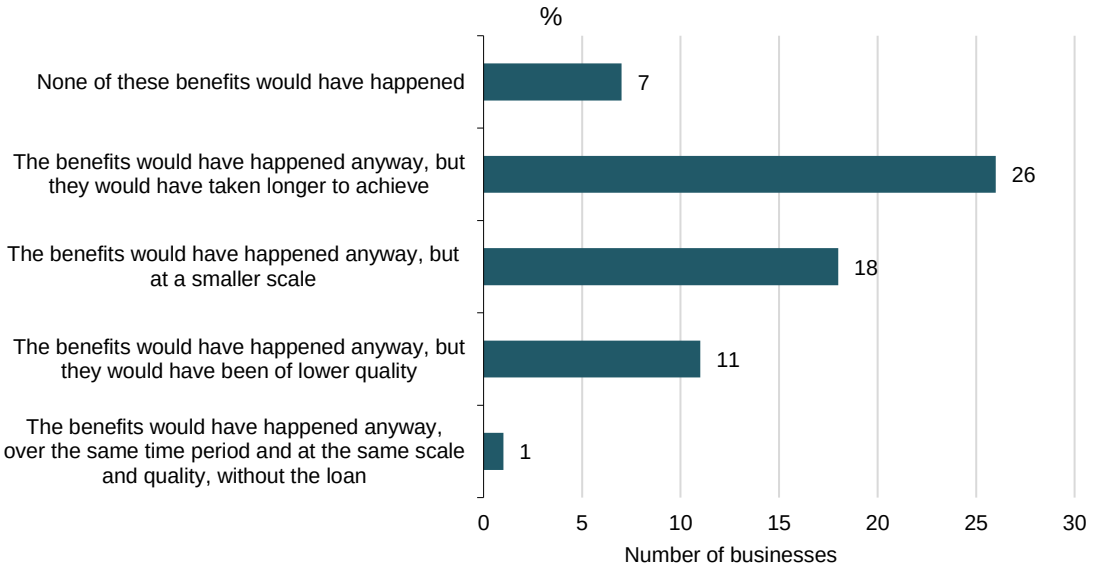
- **Increased R&D investment** – the loans have significantly increased investment in R&D with an average increase of £414k attributed to innovation loans. Applying this average to the 17 cases that reported higher R&D expenditure gives a total increase of £7.0 million to date.
- **Intellectual Property (IP)** – given the relatively short time since many of the businesses were awarded the loan, there has been a high number of IP applications (14 had applied to date and 11 plan to do so in the future).
- **Processes and productivity** – there were six businesses that had introduced new or improved processes to date, and a further 19 expect to do so in the next two years. All believe these processes will reduce costs, and almost all thought it will improve quality and save time.
- **Follow-on funding** – around a third of the businesses have secured follow-on funding so far, worth at least £29 million, and most attribute this to the innovation loans. Nearly all of it was raised through equity (£21 million within the sample) and a smaller amount, £3.7 million, from grant funding. Given the relatively short period since the loan awards, this is very encouraging.

24. The businesses in the case studies also found that the loan improved their ability to raise private sector finance. It acted as an endorsement (or 'certification') that helped to de-risk the project for investors and gave the business the confidence to approach investors.

Outcome additionality

25. The pattern of outcome additionality is consistent with the findings from the case studies. These are innovative businesses and, regardless of the loan, they will try to pursue the development of ideas they believe will succeed, eventually. The loan enables them to do this by accelerating development, by allowing activity to be scaled up or by improving the quality of the development. (Figure 2). Among all the case studies, the innovation loan was considered the "important" or "critical" contributory factor to achieving benefits.

Figure 2: Additionality of the outcomes – accelerating projects



Source: SQW/BMG survey (38 cases)

Emerging impacts (Section 7)

26. Despite the relatively short time since many of the businesses had received the loan (and the fact that the loans are still being drawn down) there is evidence of some impacts, particularly on employment. At this stage, this reflects the investments in R&D rather than in scaling up production.

27. The scale of the economic impact will ultimately depend on the extent to which this pipeline of investment converts into new sales and GVA. From the survey and the case studies, we would say that the results are very encouraging. One of the main lead indicators of impact is the high level of follow-on investment which gives confidence about the commercial prospects of these projects.

28. Total employment at the time of application across the 38 businesses was 652 (17 employees per business on average). At the time of our interviews this had risen to 837. These businesses had created 185 new posts. Businesses that received the loan earlier (Infrastructure Systems) have had more time and consequently had grown employment faster.

29. **Three quarters (76%) of the sample reported that employment had increased because of the loan.** All the businesses estimated that in three-years' time they will employ more people, estimating a further 266 FTEs attributable to the loan.

30. There has been less impact on turnover to date. Twenty-four cases provided details of their turnover with the highest turnover reported as £4 million and an average of £938,000. In this context, the loans are clearly a very significant sum for all the businesses. In half the cases (where the business reported turnover data) the loan was greater than their turnover in the last year.

31. Across the sample of 38 cases, 10 businesses reported a combined increase in turnover of £2.8 million, attributable to the loans. While 20 cases reported no impact yet.

32. Taking account of the counterfactual (what would have happened without the loan) and adjusting to reflect the population of 69 loan agreements signed, **we estimate an additional 114 new jobs and £4 million turnover have been supported to date.**

33. One of the aims of innovation loans is to capture direct financial returns through interest income and loan repayments (which may be reduced by losses through borrower defaults). More information on this will be obtained over time as businesses use their loans and grow. As indicated above, the original Business Case (2017) used a higher central default probability estimate compared with the actual pilot portfolio. According to Innovate UK, no defaults have yet occurred, although one business has indicated its intention to enter into a company voluntary arrangement with its creditors.

Evidence from unsuccessful businesses (Section 8)

34. For the unsuccessful businesses (like the successful ones) there were few, if any, alternative sources of funding. Even looking only at the more "investable" cases, a third had been able to find alternative sources of funding. This strengthens the case that the innovation loans are putting additional funds into the market. There was only one case that had found alternative funding after meeting the innovation loans threshold (but had been declined on the basis of the credit review).

35. Where the loans have been made, they have had a significant effect on the timing of R&D and innovation projects. Conversely, where loans were not awarded, firms reported that this has had significant adverse effects on their survival and growth (an indicator of the counterfactual).

36. The survey evidence shows that despite being unsuccessful, businesses felt that they had strengthened their ability to raise and manage investment and improved their investment readiness.

Areas for development

37. The main areas for development of the innovation loans programme are outlined below.

- Analysis of the programme data suggests that demand (and loans) are concentrated in London and the South East. Given the finance challenges in other regions (including limited demand from more established SMEs), Innovate UK should continue to look at how this can be addressed.
- Further promotion of innovation loans to finance and business intermediaries - public and private – this is part of a wider issue for Innovate UK/government funding.

- Consider further co-ordination and integration between innovation loans and other Innovate UK funding (including grants) and programmes to accelerate project commercialisation.
- The loan terms have clearly been seen as very attractive and the evaluation findings support the decision to increase the interest rate. It will be important to monitor demand under the new terms.

1. Introduction

1.1 In the 2015 Spending Review it was announced that the UK Government would introduce new innovation finance products to support innovation. Innovate UK worked with the Department for Business, Energy and Industrial Strategy (BEIS) and other partners[1] to develop a new repayable finance product – innovation loans – with the combined objective of bridging the funding gap for innovative businesses whilst also providing value for money for the taxpayer. Government funded loans for innovation are new to the UK and therefore Innovate UK is running a pilot programme over two years across financial years 2018/19 and 2019/20. A total of up to £50 million is available for business innovation projects, with UK small or medium-sized enterprises (SMEs) able to borrow between £100,000 and £1 million. In 2019, the pilot was extended with £25m additional funding.

1.2 The innovation loans were delivered by Innovate UK through five competitions, covering sectors as well as open competitions.[2] This is for SMEs that want to scale up and grow by developing new or improved products, processes or services. The innovation loans can be used for late-stage research and development (R&D) projects that have a clear route to commercialisation. The aim is for innovation loans to align with other public and private finance sources on offer to provide a continuum of finance options – not to compete with existing market finance but to enhance the finance landscape.

1.3 Through the pilot, Innovate UK is developing a portfolio of businesses across a range of technologies (e.g. industrial robotics, 3D printers, feminine care products), sectors and markets (e.g. advanced manufacturing, education, healthcare, clean energy).[3] The businesses are relatively young and small (7-10 years old and with net assets of c. £500k). In most cases, they have already been developing their technologies (often with grants).

1.4 In January 2017, a consortium led by SQW produced a report[4] for BEIS to scope the options for evaluating the new innovation finance products that were (at the time) expected to be launched from late 2017. The report developed a pilot and impact evaluation framework, taking into consideration how the role of early evidence could inform ongoing learning with respect to developing innovation finance products.

1.5 Subsequently, Innovate UK commissioned SQW to undertake an interim evaluation of the £50 million innovation loans pilot programme in late 2017. The work commenced in January 2018 and involved work across three phases: research set-up and scoping; delivery and monitoring of the programme; and primary research with businesses. An Early Interim Report with preliminary findings was produced in May 2019. This was followed by further research and analysis of the evidence from beneficiaries. The findings are presented in this Interim Report. **It is important to highlight that the findings in this Report should be interpreted as interim given the relatively short timeframe between businesses receiving innovation loans and them progressing their projects**.

[1] The British Business Bank (BBB) and UK Government Investments (UKGI).
[2] Two further competitions are planned as part of the pilot extension.
[3] https://innovateuk.blog.gov.uk/2019/07/11/extending-our-innovation-loans-pilot/
[4] SQW, Enterprise Research Centre and St John's Innovation Centre (2017) Scoping pilot and impact evaluations of the new innovation finance products report for BEIS. See report here.

Study objectives and scope

1.6 The BEIS (2017) 'Full Business Case'[5] for innovation loans identified the following objectives for the innovation loans pilot: (i) 'successfully deliver five loan competitions over the period October 2017 – December 2018, and resulting in at least 100 loans before spring 2019'; and (ii) 'conduct an independent external audit by Summer 2019 to determine the effectiveness of the delivery mechanism…and assess whether the intervention is meeting the policy objectives at the best possible costs based on the emerging primary evidence collected through the pilot'.

1.7 SQW carried out this interim evaluation which includes a review of processes predominantly from a *customer experience perspective*. Another independent firm delivering internal audit services to Innovate UK, RSM[6] carried out reviews of governance, policies and processes, reporting separately. Also, the National Audit Office (NAO)[7] will undertake an audit of the financial statements of Innovate UK Loans Limited.

1.8 Taking into consideration the above, the overall objective of the interim evaluation was to assess the delivery of innovation loans using a formative (i.e. process) approach to evaluation and to make an early assessment of progress towards intended outputs and outcomes, to the extent possible. In doing so, it provides the opportunity to evolve and refine the policy and its implementation for scaling up/wider roll out. Specifically, the interim evaluation seeks to answer the five evaluation questions:

Table 1-1: Interim evaluation objectives

#	Key research questions/objectives
1.	What is the interest in, and demand for, the pilot products?
2.	What is the nature of the businesses applying, and the projects which form the focus of the applications for funding?
3.	What would have happened to the innovation projects supported if they had not been offered these loan contracts?
4.	How effective are the processes of implementation and what are the experiences of the customer journey?
5.	What evidence is there of progress towards the achievement of intended outputs, outcomes and impacts?

Source: Study Specification (2017)

1.9 Given that the implementation of innovation loans is in its 'infancy' (see section 4 for timings), the focus of the interim evaluation is on evidencing the interest, demand and delivery of innovation loans. The evidence on early outputs and outcomes experienced (and expected) by businesses has, as anticipated, been more challenging to capture as insufficient time has elapsed for the funded innovation projects to progress. Nevertheless, we have obtained and analysed evidence on progress towards the achievement of early outputs and outcomes (and in some cases early impacts) by businesses – to the extent possible at this stage. This interim evaluation does not include the longer-term impact evaluation. A full impact evaluation reporting at the end of the pilot programme will build on the results of the interim evaluation.

[5] BEIS (2017) Full Business Case for Innovation Loans Pilot.
[6] https://www.rsmuk.com/what-we-offer/by-service/consulting
[7] https://www.nao.org.uk/

1.10 In addition, the Study Specification identified four questions that were *outside* the scope of interim evaluation but will form a key part of the final impact evaluation, and for which baseline data are required. These questions relate to: the 'additional' effect of the loan product on outcomes; spillover effects; crowding out of R&D; and potential default profiles and rates. At this stage, we expect to draw on our analysis of the evidence from the interim evaluation (e.g. potential findings on additional effects on outcomes).

Innovation loans product features

1.11 To summarise, innovation loans are designed for SMEs that are innovative, growth oriented, "scaling up" not "starting up", credit constrained, undertaking a later stage R&D project ("experimental development") with clear route to commercial success – inherently risky project/company characteristics that would not be funded on reasonable terms by commercial lenders. The loans are also intended to allow previous Innovate UK grant recipients to build a borrowing track record and are not intended to replace grants or be used for match funding a grant. The main product features of innovation loans are set out in Table 1-2. These need to be considered as they influence the interest in, and demand for innovation loans (as discussed in section 4).

Table 1-2: Innovation loans – Product features

Features	Summary
Customer type	• SMEs with at least one employee • Not available to large companies, universities, and collaborative consortia/projects
Loan size	• £100k-£1m
Pricing	• HMT discount rate, 3.7% • Interest-only period (up to 3 years project / up to 2 years to get to market) • No fees
Security required	• Secured against assets purchased and IP developed using funding from the Innovate UK loan, plus a fixed and floating charge to ensure participation in any realisation / wind up, which may be subordinated to existing or future senior secured commercial debt
Availability period	• Up to 3 years, with quarterly drawdown in advance, to fund up to 100% of eligible project costs including capital expenditure, materials, labour, sub-contractors and overheads • No principal payment during the drawdown
Extension period	• Up to 2 years or first commercial sale from the project if earlier • No principal repayment during extension period. If businesses wish to begin repayments early then there is flexibility
Repayment period	• Repayment period of up to 5 years (equal quarterly payments) • Flexibility to repay the outstanding balance early.

Source: BEIS (2017) Full Business Case; Innovate UK, Introducing Innovation Loans PPT (October/November 2017); SQW – updated to reflect actual product features

Structure of report

1.12 The remainder of this report is structured as follows:

- **Section 2**: sets out the evaluation approach and research methods used to address the research objectives. This includes key challenges affecting the evaluation, the logic model and theory of change for innovation loans, and key product features.
- **Section 3**: presents some of the main developments in the wider UK innovation funding landscape that are relevant to innovation loans.
- **Section 4**: provides evidence on the interest in, and demand for, innovation loans. It also profiles the nature of the businesses applying (and non-applicants), and the projects which form the focus of the applications for funding.
- **Section 5**: provides an assessment of the delivery of the innovation loans pilot. This includes the effectiveness of the processes of implementation and the experiences of the customer journey.
- **Section 6**: provides an early assessment of progress towards intended outputs and intermediate outcomes resulting from innovation loans.
- **Section 7**: presents the emerging impacts resulting from innovation loans. It also covers the additionality of innovation loans (finance and project).
- **Section 8**: presents the findings from the telephone survey of unsuccessful businesses.
- **Section 9**: presents the conclusions and identifies key lessons learned from the pilot.

1.13 There are five annexes containing: the list of consultees (Annex A); a theory of change for innovation loans (Annex B); details of the innovation loans delivery model and feedback from businesses and Innovate UK staff (Annex C); key assumptions for estimating impacts (Annex D); and case studies of business beneficiaries (Annex E).

2. Evaluation issues, approach and methods

Evaluation issues and challenges

2.1 Government supported repayable finance for innovation projects has not been tested in a UK context. The innovation loans pilot programme is the first case of its kind. Not surprisingly, there are issues and challenges that the interim evaluation has had to 'grapple' with to ensure that our approach and research methods (see below) are suitable to gather and analyse the required evidence whilst taking into consideration the nature of the innovation loans products and programme. Recognising and addressing these challenges helps to contextualise and assess the progress of the innovation loans pilot programme to date (as reported in later sections) and ultimately inform policy including decisions on potential wider-roll out. In outlining the issues and challenges below, we have drawn on our previous scoping work, implementation of the ongoing pilot, and our wider knowledge and review of innovation and finance literature.

2.2 There are general issues that are applicable to innovation interventions such as the complicated non-linear nature of innovation and how this leads to intended effects for businesses including over long and varying timescales; and the various actors playing a role in supporting R&D activities through multiple interventions. These also apply to innovation loans. Aside from these general points, we highlight the following issues and challenges specific to innovation loans and that relate to each of the interim evaluation research questions.

- *Interest and demand*: the demand for the innovation loans is likely to vary by, for example, sector, size of firm, and stage of development. As a new product, levels of interest and demand, including from certain groups, may take time to 'settle down'. For example, there could be pent up demand, or conversely it may take time for certain groups to find out about the product. Market acceptance and technical barriers (regulatory) are also key barrier factors.[8]

- *Nature of business applicants*: there is heterogeneity in the firms (and projects) that the innovation loans attract. The appetite for the loan product (and for specific features) is likely to vary by e.g. sector, size of firm, and stage of development. For instance, large firms tended to have different appetite for the loan product compared to smaller firms. This heterogeneity has implications for development pathways, routes and timescales to outcomes which need to be considered at later stages of the interim evaluation (and in the impact evaluation).[9]

- *Processes and customer journey*: the innovation loans pilot is delivered by Innovate UK through two sector-based competitions and subsequently through 'open' competitions. This implies a need to ensure consistency in delivery and to be sensitive to different sectors/markets. It is important to understand the customer journey

[8] Owen, R., Mac an Bhaird, C. and North, D. (2019) The Role of Government Venture Capital Funds: Recent Lessons from the UK Experience. Strategic Change: Briefings in Entrepreneurial Finance 28(1).
[9] BEIS (2017) Journeys of Innovative Businesses to Finance report.

including the timings involved as it can have a bearing on how loans meet the needs of businesses.

- *Additionality*: measuring the policy-off scenario – finance and project additionality – requires gathering evidence on what would have happened *without* innovation loans. This primarily draws on feedback from unsuccessful business applicants (especially those with 'scores' close to successful applicants). However, businesses may find it difficult to clearly set out how innovation loans are additional given the (often) multiple factors influencing R&D activities and the varying routes to outputs and outcomes. An additional source for capturing additionality is feedback from businesses that were interested in innovation loans but did not apply (i.e. those that were discouraged). Securing participation from this group is even more challenging compared to those that were unsuccessful.

- *Progress towards outputs and outcomes*: a relatively short time has elapsed since businesses successful in receiving innovation loans (e.g. drawdown started in Q3 2018/19) and them progressing their innovation projects. It is, therefore, potentially too early to gather collect evidence on outcomes. This will need to be carefully checked through monitoring data and consultation feedback over time and build on the data collected through this Interim Evaluation (including as part of the impact evaluation later).

Overall approach

2.3 Given the above issues and challenges, our approach broadly follows the evaluation framework set out in our previous scoping study. Thus, this interim evaluation uses a formative (process) evaluation to assess the delivery of the innovation loans programme, combined with a theory-based assessment to test the extent to which early outcomes or changes in company behaviour have occurred as a result of the innovation loan. This includes development of a logic model and theory of change (set out later in this section). The formative evaluation required collation and analysis of monitoring data and feedback from applicants – successful and unsuccessful businesses; and interested businesses that did not apply – and those involved in delivery of the programme. The assessment of early outcomes used a particular theory-based approach – 'contribution analysis' – to test the evidence on early outputs and outcomes resulting from the innovation loans programme, whilst considering other factors which may have contributed to the same reported benefits. Our approach, therefore, draws on mix methods (qualitative and quantitative) below to meet the objectives of the evaluation to produce the early results and insights presented in this report.

Research methods

2.4 We completed the following research tasks as of August 2019:

- Inception meeting between SQW, Innovate UK and BEIS held in January 2018; following this we produced an inception note.

- Focused (initial) review of documentation for the pilot programme, including the logic model for the loan product.

- Initial interviews (x4) with Innovate UK and BEIS to further understand the key research questions, issues and priorities for the interim evaluation; and understand how the process of the competitions worked (see Annex A for list of consultees).
- Meeting with Innovate UK on monitoring data requirements to understand: data requested in application forms; planned on-going monitoring; and related process issues (taking account of the key data indicators). These discussions helped inform the final research design.
- Drafted an inception report informed by the results from the initial scoping tasks, setting out the proposed research design, key milestones for the evaluation, data collections requirements and risks.
- Meeting with the client group to discuss the draft inception report and the next phase of the study.
- Developed research tools for surveys, interviews and case studies – these were prepared in draft for client comments, before being finalised.
- Analysed monitoring data on implementation of the loan programme – covering application data for both successful and unsuccessful applicants.
- Early review of businesses that had initially shown interest in innovation loans but did not make an application – two online surveys and two papers with findings from the surveys (see below).
- Early review of the delivery process – interviews with Innovate UK officials involved in implementation of pilot (x8): programme leads, representatives from application assessment team, credit assessment, and monitoring officers (see Annex A).
- Telephone interviews with 38 successful businesses including 10 as case studies (initial and follow-up case study interviews).
- Telephone interviews with 78 unsuccessful businesses.
- Produced 'headline' findings paper for the innovation loans Business Plan submission to BEIS for consideration of an extension to the initial pilot into 2019/20.
- Presented headline findings at the Innovation Loans Portfolio Event in March 2019.
- Collated and analysed the evidence from the various research strands.
- Produced the Early Interim Report in May 2019.

2.5 We provide further details on the main research methods below.

2.6 We undertook **an early review of businesses that had initially shown interest in innovation loans but did not make an application**. This involved a survey of businesses that registered for the first and second innovation loans competitions: Infrastructure Systems,[10] and Manufacturing and Materials Readiness. Feedback from businesses was

[10] The early review of the first competition also included consultations with selected intermediary organisations who were involved in the programme.

gathered through two separate electronic surveys, providing a total of **142 responses** from the first two competitions. The findings from the review of businesses were summarised in two separate papers submitted to Innovate UK in May and July 2018.

2.7 In addition, we undertook an **early review of the delivery process** of the programme based on eight interviews with representatives from Innovate UK and other external consultants involved in the delivery and monitoring of the programme. The purpose of these interviews was to gather feedback on the process and 'customer journey'. The emerging findings were set out in a paper submitted to Innovate UK in October 2018.

2.8 We completed **telephone interviews with 28 businesses successful in receiving an innovation loan**. These interviews covered a range of topics including: businesses' awareness of innovation loans; the key attractors to the loan product; application process; activities funded in the innovation project; assessing early progress towards innovation outcomes (e.g. development of new products or processes, investment in R&D, employment and turnover); understanding what would have happened to the projects if they had not been offered the loan (finance and outcome additionality).

2.9 We also completed **initial and follow-up case study telephone interviews with 10 businesses successful in receiving an innovation loan**: eight from the first two sector competitions, and two from the first of three open competitions. These interviews gathered evidence on: reasons why innovation loans were needed; early progress on projects financed; alternative finance sought; the innovation loans funding process; finance additionality and leveraged; emerging outputs and outcomes; what would have happened to the projects supported without the innovation loan (i.e. additionality); and lessons on what worked well (and less well) in the innovation loans programme.

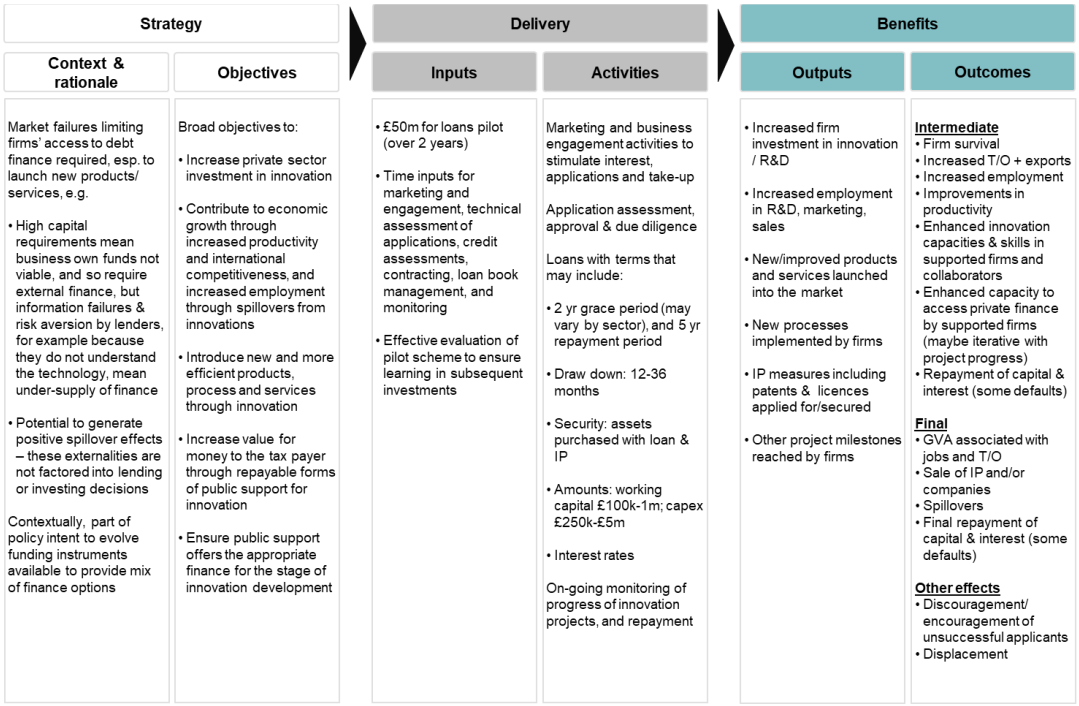
2.10 To compare the evidence from successful businesses, we completed telephone interviews with **78 unsuccessful applicant businesses** so far (out of 164 valid contacts) to understand the 'counterfactual' scenario. This included gathering views on: delivery of innovation loan and their experience of the application process; any alternative finance secured after being rejected; whether applying to innovation loans led to businesses having greater confidence in their ability to raise finance in the future; improved their ability to make their case for investment.

Logic model and theory of change

2.11 The logic model (and supporting theory of change) for innovation loans was developed as part of our scoping work. This is re-produced in Figure 2-1 below (with the theory of change set out in Annex B). The logic model covers the strategic background (i.e. rationale and objectives), delivery (i.e. inputs and activities) and expected benefits (i.e. outputs and outcomes). The benefits cover the initial outputs, such as R&D investment, and new products and services that are delivered by projects financed by innovation loans. The benefits also include: the subsequent changes in behaviour and performance of the companies including intermediate and final effects such as turnover, exporting, innovation capacities, Gross Value Added (GVA) and loan repayments, and potential third-party effects of the products, e.g. relating to discouragement issues, displacement and spillovers.

2.12 The important point to note is that the interim evaluation seeks to test the early progress of innovation loans pilot programme logic model and accompanying theory of change outlined below and in Annex B.

Figure 2-1: Innovation loans logic model



Source: SQW in BEIS and Innovate UK (2017) New Innovation Loans – Pilot Evaluation Framework

Rationale for innovation loans

2.13 The Full Business Case (2017) sets out the rationale for the innovation loans intervention. Part of the rationale rests with the strategic case: the 2015 Spending Review committed the UK Government to making available up to £165m of new repayable finance products per annum by 2019, offsetting a reduction in grant funding designed to reduce the national deficit. In 2016, the UK Government announced an additional £2 billion in grant funding over four years for research and innovation via the Industrial Strategy Challenge Fund, changing the innovation funding landscape. As a consequence, BEIS was able to revisit the scale of the innovation loans pilot.

2.14 Market failures limit firms' access to debt finance required, especially to launch new products/ services: *high capital requirements* mean business own funds are not viable, and so require external finance, but *information failures and risk aversion* by lenders, for example because they do not understand the technology, mean that lenders do not always have the expertise to understand a new technology or its application, resulting in under-supply of finance. There is also the potential to generate *positive spillover effects* over time – these externalities are not factored into lending or investing decisions. In addition, the Full Business Case (2017) articulates further reasons for the rationale for innovation loans.

2.15 First, there are limitations to grant funding – businesses require different types of financing at different phases of the product development life-cycle and each phase requires different financial approaches and finance products. Innovation support in the UK has historically been

grant-based which is appropriate for early stage innovation to fund proof of concept and prototype development. Grant funding as a proportion of project costs also reduces as R&D activities get closer to commercialisation, which may reduce the incentive effect of support.[11]

2.16 Second, the innovation literature identifies a 'valley of death' for innovative companies beyond the prototyping stage where businesses (often technology based) have a working prototype for a product but need further finance to get to market. This is evident in the scaling back of structured finance operations in the majority of major banks for ticket sizes less than £5m. This is also found in the prevailing private debt market, where the economics of making smaller ticket investments are 'weak' – making a £2m loan is as costly as making a £5m loan, with a smaller upside available.[12] Grant funding can fill this gap, but repayable finance may offer better value-for-money and have similar levels of impact. Innovation loans are expected to help businesses overcome this funding gap by providing an affordable form of debt financing not available for these firms in the market.

2.17 Third, there exists a 'missing-loan market' for innovative firms – the loan market is small compared to the general business population: firms not being able to access finance they sought. The provision of debt finance by banks is generally broad and most products were only accessible to SMEs that fit the risk profile of lenders, and this may have been a barrier for certain types of growth-oriented or innovative companies.

2.18 Fourth, credit rationing is especially an issue for innovative small firms that lack trading history and tangible assets – innovative firms are unlikely to have the collateral required by a bank which would typically ascribe nil value to intangible assets and IP. This reluctance can be seen in the scaling back of structured finance operations in the majority of major banks for ticket sizes less than £5m.

2.19 Fifth, innovation loans will help businesses overcome this funding gap by providing an affordable and accessible form of debt funding for credit rationed firms seeking to innovate at later stages of development where there is an identifiable route to market. This will ensure innovative businesses can access a continuum of funding[13] that meets their needs at each stage of their development, up to the point at which the private sector is willing to invest. Other countries (Finland, The Netherlands, France, and Spain) already offer this form of debt finance and this pilot aims to test whether this could be an effective solution in the UK.

2.20 Finally, the policy is expected to complement and broaden the range of grant-based support provided by Innovate UK for stimulating business-led innovation. Innovation loans sit as part of the continuum from research through to commercialisation – they are part of a new offer to innovative companies, not a replacement for existing activity.

[11] Also, under state aid rules grants can only fund a limited proportion of eligible costs to a firm which may for some firms be insufficient to enable them to carry out a project in the absence of 'match funding'.
[12] North et al. (2013) Funding the growth of UK technology-based small firms since the financial crash: are there breakages in the finance escalator? Venture Capital Journal.
[13] This is otherwise referred to as the 'smooth' operation of an innovation finance escalator. See Mason (2017) Chapter 17 Financing Entrepreneurial Ventures in The SAGE Handbook of Small Business and Entrepreneurship.

3. The wider UK innovation investment landscape

Section purpose

This section adds to the evidence and rationale for the innovation loans pilot and its position in the funding landscape.

Summary of key finding

There is a considerable UK patient capital finance gap in the £250k-£5m+ early stage innovation market (BEIS, 2015) for existing businesses undergoing new innovation cycles that have innovations at advanced stages of R&D and require substantial external investment to reach the market and establish a market foothold – market traction. Such high risk investment markets are not the domain of standard high street bank lending, due to a range of factors.

Prior to Innovate UK's innovation loan pilot, there have been no national government supported loan funds to address this scale-up stage.

Lenders that have entered this market tend to be regionally oriented and with some sector preferences. These include, UK Government (ERDF-supported) Regional Investment Funds (e.g. Northern Powerhouse and Midlands Engine Investment Funds). The key point to note is that these regional funds often only lend at the micro-finance level to early stage innovators, with the more substantial loans targeted at existing, larger SMEs (BBB, 2019a regional programmes).[14]

Owen et al (2018)[15] point to a long existing paradox in innovative SME finance in the UK relating to the underrepresentation of early stage and scale-up finance in regions outside of the Oxbridge-London golden triangle (i.e. outside of the London, SE and EE regions) and their increasing over reliance on public funding instruments (Mason and Pierrakis, 2013).

As the only national programme, the extent of the geographic distribution of innovation loans will be important given the regional disparities in accessing debt (and equity) funding.

3.1 Innovation loans do not operate in a vacuum and need to fit within the wider landscape for innovation, business and finance support; not least as an important objective of the programme is to deliver value for money to the taxpayer and innovation loans should not compete with existing finance providers. It will need to align with products, both public and private, which are already available in the wider finance landscape. In this regard, it is important to understand the other options considered and used by applicants before and after receiving innovation loans. As mentioned, the aim of innovation loans is to align with other

[14] BBB (2019a) Regional Programmes https://www.british-business-bank.co.uk/regional-funds/
[15] Ibid 16.

government supported finance measures and ultimately provide greater co-ordination and coherence in the financing landscape.

3.2 Notwithstanding the above, the loan products are expected to fit and add to the finance options available for innovation, so it becomes important to consider how they are likely to affect and address the gaps in provision. In this regard, innovation loans will need to show that the specific gaps in the innovation finance landscape are being addressed (as described in section 2).

3.3 The remainder of this sub-section sets out the main developments in the wider UK innovation funding landscape that are relevant to innovation loans given their purpose and target market (i.e. high risk, late stage R&D projects with clear route to commercialisation). Specifically, developments in the SME demand for debt finance, alternative lenders operating in the innovation loans space, and the regional distribution of national funds. The purpose is to help contextualise the role/fit of innovation loans in the wider landscape, and inform the research evidence presented in this report.

Overall decline in SME demand for bank debt finance…

3.4 Since the Global Financial Crisis (2008), there has been a general shift from debt to equity and alternative non-bank debt finance. Indeed, recent studies demonstrate that SME demand for debt finance has been depressed (Owen et al, 2016; BBB, 2019).[16] It is worth noting that around one in ten SMEs are discouraged from borrowing, due to factors such as perceived high costs, lack of suitable finance and fear of application refusal (Owen et al, 2016).[17] North et al (2013)[18] and Lee et al (2015)[19] highlight the shift away from bank debt towards equity finance, whilst Owen et al (2016; 2018)[20] [21] and Baldock and Mason (2015)[22] highlight the rise of alternative (non-bank) finance including crowdfunding, business angel networks/ angel capital groups.

3.5 Furthermore, national Peer-to-Peer (P2P) debt finance lenders such as Funding Circle, offering SMEs rapid access to unsecured lending at between £10k-£500k, typically require at least 18 months trading track record – thus representing an effective fast-track substitute for more traditional mainstream bank lending, whilst the Enterprise Finance Guarantee Scheme also applies to mainstream high street banks lending only to SMEs with trading track records of at least two years (North et al, 2013).[23]

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[16] Owen R, Mason C, and Pierrakis (2018) Is alternative finance the panacea for early stage SMEs? The UK case for improved regional policy coordination. Paper to the Institute for Small Business and Entrepreneurship conference, Birmingham, November. Also, British Business Bank (2019) Small Business Finance Markets.
[17] Owen R, Botelho T, and Anwar O (2016) Exploring the Success and Barriers to SME finance and its potential role in achieving Growth. Enterprise Research Centre (ERC) Research Paper No.53, January. https://www.enterpriseresearch.ac.uk/wp-content/uploads/2016/12/ERC-ResPap53-OwenBotelhoAnwar-03.01.pdf
[18] North D, Baldock R, and Ullah F (2013) Funding the growth of UK technology-based small firms since the financial crash: are there breakages in the finance escalator? Venture Capital 15(3): 237-260.
[19] Lee N, Sameen H, Cowling M (2015) Access to finance for innovative SMEs since the financial crisis. http://eprints.lse.ac.uk/60052/1/Lee_Access-to-finance-for-innovative-SMEs_2015.pdf
[20] Ibid. 17.
[21] Ibid 16.
[22] Baldock R, and Mason C, (2015) UK Government Equity Schemes, Post GFC: The roles of the Enterprise Capital Funds and Angel Co-investment Fund in the new UK finance escalator, Venture Capital 17 (1-2): 59-86.
[23] North D, Baldock R, and Ullah F (2013) Funding the growth of UK technology-based small firms since the financial crash: are there breakages in the finance escalator? Venture Capital 15(3): 237-260.

3.6 Whilst many studies demonstrate that SMEs have a pecking order preference for debt over equity finance (Owen et al, 2016; BEIS, 2017)[24] – citing equity aversion due to cost and ownership issues – debt finance with the scale (£250k to £5m) and patient capital characteristics (3-5+ years for returns on investments) has been in very short supply (BEIS, 2017). The provision of debt finance for relatively early stage ventures remains patchy and highly regionally differentiated (BBB, 2019; Owen at al 2018).[25]

3.7 A fundamental finding of BEIS (2015)[26] The Innovative Firm's Journey to Finance report was that whilst there have been concerted efforts to increase private investment into the early-stage innovation scale-up, the patient capital gap was growing (in volume and size range). This finding was supported in the Greater London Authority (2013)[27] SME finance in London study which gave rise to the London Co-investment Fund (LCIF). At a national level the UK government's Enterprise Capital Funds (ECFs) and Angel Co-investment Fund provide sector agnostic government-private investor co-financing to address this gap (typically in the £250k to £2m range).

3.8 Prior to Innovate UK's innovation loan pilot, there have been no national government supported loan funds to address this scale-up stage for highly innovative firms.

Alternative lenders operating in the innovation loans space

3.9 As noted above, there is a considerable UK patient capital finance gap in the £250k-£5m+ early stage innovation market (BEIS, 2015; see also Breedon, 2012)[28] for existing businesses undergoing new innovation cycles that have innovations at advanced stages of R&D,[29] but require substantial external investment to reach the market and establish a market foothold – market traction. Such high risk investment markets are not the domain of standard high street bank lending, due to a range of factors:

- lack of trading track record, lack of collateral, information asymmetries, agency failures leading to adverse selection and moral hazards, and the high cost of diligence
- the requirements for ongoing non-financial business support (offered by equity investors) to optimise investments and negate moral hazards and the problems of overgearing[30] for more established SMEs requiring substantial patient capital.

3.10 In recent years a few lenders have entered this market, but they tend to be regionally oriented and with some sector preferences. These include, UK Government (ERDF-supported) Regional

[24] BEIS (2019) Equity Finance and the UK Regions: Understanding Regional Variations in the Supply and Demand of Equity and Growth Finance for Business. Department for Business, Energy and Industrial Strategy (BEIS) Research Paper No. 069/1718, July.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818837/sme-equity-finance-regions-research.pdf
[25] British Business Bank (2019) Small Business Finance Markets.
[26] BEIS (2015) The Innovative Firm's Journey to Finance. A Report by BMG Research and CEEDR. BEIS Research Paper Number 23.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/666878/BEIS_format_Innovative_Firms_Journey_to_Finance_BMG_CEEDR.pdf
[27] SQW and CEEDR (2013) SME Finance in London. Report for the Greater London Authority.
http://www.sqw.co.uk/files/4913/8620/8476/15121_-_SME_finance_in_London_-_final_report_November_1.pdf
[28] Breedon (2012) Breedon Review.
[29] As well as SMEs that are either pre-trading, but close to trading.
[30] Gearing is the ratio of a company's debt to equity.

Investment Funds[31] (e.g. Northern Powerhouse and Midlands Engine Investment Funds) offering micro finance loans £25kto £100k and larger loans £100k to £750k in the Northern region (excl. Northumbria), and micro loans of between £25k-150k and larger loans of between £100k and £1.5m in the Midlands.[32]

3.11 The key point to note is that these regional funds often only lend at the micro-finance level to early stage innovators, with the more substantial loans targeted at existing, larger SMEs (BBB, 2019a regional programmes).[33]

3.12 The rise of Challenger Banks and Fintechs means not being constrained by physical branch requirements. The EY (2018)[34] report on UK SME lending points to over 50 new entrants into this market in the last decade (e.g. Aldermore, Shawbrook). These can potentially lend to SMEs using risk assessing algorithms, low admin costs, sector specialist skills, non-financial ecosystem support services etc. These are the disruptive banks of the future, but are difficult to assess as yet.

Regional distribution of national funds

3.13 Owen et al (2018)[35] point to a long existing paradox in innovative SME finance in the UK relating to the underrepresentation of early stage and scale-up finance in regions outside of the Oxbridge-London golden triangle (i.e. outside of the London, SE and EE regions) and their increasing over reliance on public funding instruments (Mason and Pierrakis, 2013).[36] The recent BEIS (2019)[37] Equity Finance and the UK Regions research paper supports this view, indicating that the probability of accessing equity finance is greatest in the golden-triangle regions, where innovation and private equity is mainly located and least likely in the Midlands and Yorkshire and Humberside. The one significant exception is Scotland, where there is a combination of long established equity support policy for VC and angel co-financing.

3.14 Since the overall decline of bank debt finance, high risk lending has not been an option for early innovation businesses – the focus has been on equity provision. Apart from the regionally focused (EU funded) equity and loan funds in the North of England and devolved nations, national programmes now overseen by British Business Bank have focused on addressing this finance gap. Baldock and Mason (2015)[38] find that the main national flagship programmes, the Enterprise Capital Funds[39] (ECFs) which co-finance private VC and Angel

[31] British Business Bank (2019) Northern Powerhouse Investment Fund - Early Assessment Report. A Report from SQW. https://www.british-business-bank.co.uk/wp-content/uploads/2019/07/NPIF-early-assessment-report-FINAL_24-July-2019.pdf
[32] It is worth noting that separate public loan fund arrangements also exist in Northumbria, Cornwall Isles of Scilly, Wales, Scotland and Northern Ireland.
[33] Ibid. 14.
[34] Ernst & Young (2018) https://www.ey.com/Publication/vwLUAssets/EY-The-future-of-SME-banking/$FILE/EY-The-future-of-SME-banking.pdf
[35] Ibid 16.
[36] Mason C, and Pierrakis Y (2013) Venture Capital, the Regions and Public Policy: The United Kingdom since the Post-2000 Technology Crash, Regional Studies, 47(7): 1156-1171.
[37] BEIS (2019) Equity Finance and the UK Regions. Understanding Regional Variations in the Supply and Demand of Equity and Growth Finance for Business. BEIS Research Paper Number 2019/012. Nick Wilson and Marek Kacer, Leeds University Business School Mike Wright, Centre for Management Buyout Research, Imperial College Business School. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/821902/sme-equity-finance-regions-research-2019-012.pdf
[38] Baldock R, and Mason C, (2015) UK Government Equity Schemes, Post GFC: The roles of the Enterprise Capital Funds and Angel Co-investment Fund in the new UK finance escalator, Venture Capital 17 (1-2): 59-86.
[39] https://www.british-business-bank.co.uk/ourpartners/enterprise-capital-funds/

Co-investment Fund[40] (ACF) tend to invest in a similar pattern to private investors, following a broadly 'two-thirds' rule of investment within the London, South East and East of England regions. In addition, the BBB's new £100m Regional Angels Programme launched in late 2018 is designed to develop clusters of angel activity to support early-stage equity to businesses across the UK, particularly in underrepresented areas.

3.15 A further finding of Owen et al (2018) (see also Zhang et al, 2017 and BBB Equity Tracker, 2018)[41] [42] is that alternative equity crowdfunding is also predominantly investing close to the Crowdfunding (CF) platforms which are predominantly in the Golden Triangle regions, the main exception being in the South West region where Crowdcube equity CF platform has been established since 2011.

3.16 Innovation loans is a national programme and the extent of the geographic distribution of the loans will be important to evidence given the regional disparities in accessing debt (and equity) funding.

[40] https://www.british-business-bank.co.uk/ourpartners/angel-cofund/
[41] Zhang B, Seigler T, Garvey K, Ridler S, Burton J, Yerolemou N (2017) Entrenching Innovation: The 4th UK Alternative Finance Industry Report. Cambridge Centre for Alternative Finance, Cambridge University, December.
[42] British Business Bank (2018) Small Business Equity Tracker. https://www.british-business-bank.co.uk/wp-content/uploads/2018/07/Equity-Tracker-Report-2018.pdf

4. Interest and demand for innovation loans

Section purpose

This section provides evidence on the interest in, and demand for, innovation loans. It also profiles the nature of the businesses applying (and non-applicants), and the projects which form the focus of the applications for funding. The evidence is drawn primarily from innovation loans programme monitoring data, survey of non-applicants (i.e. registered interest but did not apply) from the first two competitions, and consultations with nine intermediary organisations (public and private) that have been involved in promoting (and supporting) the pilot programme to businesses and other organisations in the regions.

Summary of key findings

Interest in, and demand for, innovation loans has been satisfactory overall: the pilot received 393 applications seeking £200m in funding, representing four times the capital available for commitment. However, demand in the first two competitions was slower than anticipated. These initial competitions were quite niche in scope. The pilot has learned from this and the later, open competitions have attracted greater demand.

The fifth competition received more than double the number of applications than the first. The pilot programme aimed to deliver a target of 100 loans, worth up to £50m, over a two-year period (by spring 2019). **To date 73 offers have been made and, of these, 69 loan agreements have been signed**. The open competitions have made a big difference. **The average loan value was nearly £700k compared to £500k estimated in the Business Case (2017)**.

The applications and awards have been made to business across sectors. Businesses were slightly older and larger than the overall SME population. In terms of geography, London, South East, East of England, and North West, make up nearly 70% of the applicants and are the recipients of c. 60% of the loans.

The applications covered a range of projects from artificial intelligence, internet of things to advanced robotics. The most common thematic project areas were process and manufacturing design technology; smart infrastructure; electronics, sensors and photonics; and energy efficiency.

Two early review surveys of non-applicants provided feedback on why they registered but did not apply. This highlighted several issues in the early rounds which have been addressed in the later open competitions. Some of these related to building a better understanding of a new pilot, such as who should apply and what assessors are looking for.

4.2 The innovation loans were delivered by Innovate UK through five separate competitions for applications running sequentially from November 2017 to November 2018. The first two competitions were sector focussed (Infrastructure systems; and Manufacturing & Materials); and the remaining three competitions were open. The duration of each competition was around three months. Table 4-1 identifies the five competitions and their timings.

Table 4-1: Innovation loans competitions and timings

Competition	Sector/ open	Application start	Application end
Comp 1	Infrastructure systems	8th November 2017	17th January 2018
Comp 2	Manufacturing & Materials	26th February 2018	2nd May 2018
Comp 3	Open 1	9th April 2018	13th June 2018
Comp 4	Open 2	2nd July 2018	5th September 2018
Comp 5	Open 3	17th September 2018	21st November 2018.

Source: Innovate UK

What is the interest in, and demand for, the pilot products?

4.3 **Interest in, and demand for, innovation loans has been satisfactory overall** (the pilot received 393 applications seeking £200m in funding, representing four times the capital available for commitment in the pilot). However, demand in the first two competitions was slower than anticipated. These initial competitions were quite niche in scope. The pilot has learned from this and the later, open competitions have attracted greater demand.

4.4 Table 4-2 provides data on the total number of registrations, applications made, and applications progressed to detailed credit analysis by Innovate UK. The number of registrations is an indicator of interest, while applications submitted represents the demand for innovation loans. The fifth competition received nearly 2.5 times more applications compared to the first. According to the Full Business Case (2017) the pilot aimed to deliver a target of 100 loans, worth up to £50m, over a two-year period (by spring 2019).

Table 4-2: Innovation loans – registrations, applications submitted and progressed

Competition	Registrations	Applications	Progressed	Conversion from registrations to applications (%)
Comp 1*	281	47	16	17
Comp 2*	269	32	20	12
Comp 3	815	95	24	12
Comp 4	497	104	32	21
Comp 5	517	115	28	22
Total	**2,379**	**393**	**120**	**17**

*Source: Innovate UK (06/02/19); *sector specific competitions*

4.5 **To date, 73 offers have been made, of which, 69 loan agreements have been signed** (Table 4-3). Although the disbursal of loans was initially slower than had been anticipated, the open competitions have made a big difference. This is supported by consultation evidence from Innovate UK representatives and other external consultants. Over 70 loans is reasonably

close to the target of 100. This also indicates a higher average loan value of nearly £700k compared to £500k estimated in the Business Case (2017). Since the capital available in the pilot is capped at £50m and Innovate UK chose not to scale back on the value of individual loans requested, the number of loans has fallen below the target level of 100.

Table 4-3: Innovation loans – offers and disbursement

	No. Recommended after progression	Recommend-ed (£m)	Offers signed	Loan agreements signed	Funds committed through offers (£m)	Funds drawn (at 31/07/19) (£m)
Comp 1*	11	£6,600,846	11	11	£6,600,846	£5,021,834
Comp 2*	16	£11,722,518	16	16	£11,722,518	£6,067,107
Comp 3	14	£10,588,858	14	14	£10,588,858	£5,318,996
Comp 4	17	£11,684,926	16	16	£10,393,664	£4,650,141
Comp 5	16	£9,993,749	16	12	£7,321,084	£1,919,339
Total	**74**	**50,590,897**	**73**	**69**	**46,626,970**	**22,977,417**

*Source: Innovate UK (09/08/19); *sector specific competitions*

What is the nature of the businesses applying, and the projects which form the focus of the applications for funding?

Applicant profile

4.6 The median number of employees across the businesses applying for loans is seven[43], and for those that have signed contracts the median is slightly larger (eight) – half of the awards have been made to businesses with fewer than this. The median age of the businesses awarded a loan was 10 years, which is relatively old for SMEs (80% are less than 5 years old[44]). The main sectors across the sample of applications and awards are provided in Table 4-4. The results indicate the following top three sectors of the business applicants:

- Other professional, scientific and technical activities
- Business and domestic software development
- Other research and experimental development on natural sciences and engineering.

4.7 Each of the sector categories in Table 4-4 had less than 10% of firms which demonstrates the broad range of activities that the loans are attracting and supporting.

[43] This is based on available data from 296 applicants.
[44] ONS - UK business: activity, size and location (2017).

Table 4-4: Applications profile by sector

	All applications	Progressing	Loan agreements signed
Other professional, scientific and technical activities	53	11	11
Business and domestic software development	41	7	7
Other research and experimental development on natural sciences and engineering	36	10	9
Other manufacturing	36	10	10
Other business support service activities	27	5	4
Manufacture of other electrical equipment	27	7	7
Other information technology and computer science activities	26	5	5
Health & educational	17	7	6
Research and experimental development on biotechnology	16	6	5
Computer consultancy activities	11	2	2
Manufacture of vehicles, other transport equipment and equipment for motor vehicles	6	3	3
Totals	**296**	**73**	**69**

Source: Innovate UK loans data for first 5 competitions (09/08/19); sector data available for 296 applications

4.8 The geographical distribution of applicants is shown in Table 4-5. One-third of the applicants are based in Greater London, with the South East, North West, East of England the other most frequent locations. These top four regions cover nearly 70% of all applicants. However, in terms of loan agreements signed the top four regions were: Greater London, South West, South East and North West.

Table 4-5: Geographical distribution of applicants

	Applications	Offer letters signed	Loan agreements signed
Greater London	99	27	25
South East	48	8	8
North West	28	6	6
East of England	27	4	3
South West	23	11	11
West Midlands	18	4	3
Scotland	16	2	2
Wales	13	2	2
East Midlands	10	2	2
Northern Ireland	8	4	4
North East	6	3	3

	Applications	Offer letters signed	Loan agreements signed
Total	**296**	**73**	**69**

Source: Innovate UK loans data for first 5 competitions (09/08/19); regional data available for 296 applications

4.9 It is to be expected, given the regional distribution of businesses, that most businesses (signed agreements) are from London, South West[45] and the South East and it is notable that the North West is in the top regions. In the pilot extension, Innovate UK aim to attract applicants from the under-represented regions (e.g. North East, Northern Ireland, and Midlands). This is important taking into account the marketing work being done to try and broaden access beyond London and the South.

4.10 Table 4-6 provides the distribution of loans (letter offers signed) across the first five competitions. The results indicate there is a reasonably even spread of loans across all five competitions (ranging from 11 to 16 loans). However, there is wide regional variation by competition. For example, the four North East loans were in the first two competitions, and the two Wales loans were in competition 2. Notably, East Midlands had no loans despite having 10 applications.

Table 4-6: Distribution of loans (letter offers signed) across competitions

		Letter offers signed (competitions 1-5)					
	Applications	**Comp 1**	**Comp 2**	**Comp 3**	**Comp 4**	**Comp 5**	**Total**
Greater London	99	4	2	8	6	8	28
South East	48	2	3		3		8
North West	28		3	1	1	1	6
East of England	27			1	1	3	5
South West	23	3	2		4	2	11
West Midlands	18			2	1		3
Scotland	16		1			1	2
Wales	13		2				2
East Midlands	10						0
Northern Ireland	8	1		2		1	4
North East	6	1	3				4
Total	**296**	**11**	**16**	**14**	**16**	**16**	**73**

Source: Innovate UK loans data (09/08/19); regional data available for 296 applications

Project focus of applications

4.11 The innovation loans programme received applications across a range of research areas including artificial intelligence, internet of things and advanced robotics. The programme data (external data on the applicants), where possible, classified successful and unsuccessful applications into themes within each of the four competitions. Of those that were categorised, the most common thematic project areas were process and manufacturing design technology; smart infrastructure; electronics, sensors and photonics; and energy efficiency.

[45] We understand from Innovate UK that Exeter is a specific "hot spot" for applicants.

Early review of non-applicants

4.12 SQW undertook two "early review" surveys to understand more about **why businesses that had registered had not gone on to apply for an innovation loan**. One followed up Infrastructure Systems and one after the Manufacturing and Materials Readiness competition. These provided some early suggestions around marketing and delivery of the programme, many of which had subsequently been used. For these businesses that had **initially shown interest in innovation loans but did not apply,** most operated in a range of sectors: manufacturing, engineering, pharmaceuticals, life sciences, engineering, oil & gas, renewable energy, digital technologies, and software development. Most respondents were micro-businesses; 22% had more than 10 employees; 23% (33 firms) were 'scale-ups' (fitting the OECD "high growth firm" definition adopted by the ScaleUp Institute[46]). Two-thirds were interested in innovation loans because the funding was targeted at later-stage, high-risk research and innovations. The main findings are shown below.

4.13 The surveys found that businesses usually learned about the loans from Innovate UK and KTN. Few came through intermediaries such as the Local Economic Partnerships, Growth Hubs, or Catapults, for example. This is supported by the recent survey of unsuccessful applicants. For the first two competitions, the issues reported by businesses corroborate the feedback from the intermediaries. Specifically, **the limiting nature of the timing and initial sectors, the perceived speed of lending decisions and drawdown and the need for greater clarity on what will be successful, rather than flexibility**.

4.14 The reasons for not applying (i.e. discouraged) included: lack of internal capacity or skills; unsuitable timing of the competition; and the impression that the application process would be too onerous. These findings on discouragement are strongly supported in research for the Enterprise Research Centre (2017).[47]

4.15 For intermediaries, while the loans, and the terms, were widely welcomed, there were a number of issues identified around the process. Some of these have been addressed in the subsequent open competitions:[48]

- Intermediaries advising or sign posting businesses need to understand whether or not a business will have good chance of securing a loan before recommending it. One consultee suggested that this is difficult until the programme has settled down and the focus becomes clearer. This will improve through feedback on applications and on "what works".
- Consultees found the idea of flexibility confusing and would rather have clearer guidance (again so that they can judge the chances of success before recommending or investing more time).
- The value of loans is more suited to smaller, start-ups, which is reflected in the registrations and applications.

[46] http://www.scaleupinstitute.org.uk/
[47] Ibid 17.
[48] Intermediary knowledge and issues were also flagged up in the SQW (2015) DETI study of early and growth stage financing in NI.

- Several consultees felt that the competitions provided limited windows which did not suit the timings of some of the businesses that might otherwise apply. This restricted their appeal.
- Consultees also mentioned the perceived effort and length of time involved in applying. There was also some uncertainty about who this was aimed at and its fit with other products.
- The rolling, open programme will increase the likelihood that the timing of the loans will fit the needs of businesses – which was one of the biggest issues.
- Improving case studies to help businesses and intermediaries gauge their chance of success would help decisions as to whether it is worthwhile.[49] In general, stronger feedback and communication would build interest and improve targeting.

[49] We understand that Innovate UK have used successful borrowers at later briefing events to try to show "what good looks like".

5. Assessment of delivery

Section purpose

This section provides an assessment of the delivery of the innovation loans pilot. This includes the effectiveness of the processes of implementation and the experiences of the customer journey.[50] The evidence is drawn from programme documentation, consultations with the Innovate UK team involved in delivery and monitoring, feedback from successful and unsuccessful businesses.

Summary of key findings

The evaluation evidence found that there were clear and well defined organisational structures and arrangements in place to implement the pilot programme. This includes delivery through a Special Purpose Vehicle – a wholly owned subsidiary of UK Research and Innovation. **The structures, roles, responsibilities and reporting of the Innovate UK delivery team are generally appropriate and fit-for-purpose**. Although this was the case, the various 'actors' in the delivery team would benefit from further clarity about how the teams work together. The process appears to be working better with each competition.

The main reasons for selecting an innovation loan included: attractive terms and conditions, lower cost overall, the patient payback period, retention of ownership. Importantly, innovation loans offered greater appetite for risk and a willingness to support firms that traditionally were not able to get finance elsewhere.

Overall, the businesses interviewed provided positive feedback on the delivery aspects of innovation loans. The consultation evidence suggests the customer journey from loan marketing, application and agreement and project drawdown has generally been working well for successful businesses.

This includes: communication with Innovate UK throughout; monitoring of business financials and overall relationship management; transparency of the decision-making process and feedback. The elements that scored lower were the time taken between application and decision; and marketing and promotion. Nevertheless, the scores for these were still very positive. **The vast majority of businesses surveyed considered delivery of innovation loans to be good or very good in comparison with other private sector finance providers.**

From the perspective of unsuccessful businesses, although the scores on delivery were lower, they are consistent with the pattern found among the successful businesses. The communication and the time between application and decision scored relatively highly.

Overall, the delivery of innovation loans has been especially good, with a positive relationship being developed with the successful businesses.

[50] Innovate UK Loans Limited has also commissioned external reviews of the adequacy of governance, policies and processes from RSM that go beyond the assessment reported here.

How effective are the processes of implementation and what are the experiences of the customer journey?

5.1 The evaluation uses the following sources of evidence to assess implementation and the customer journey:

- Consultations with the Innovate UK team[51] involved in delivery and monitoring
- Feedback from successful businesses (i.e. beneficiaries)
- Feedback from unsuccessful businesses
- Review of programme documentation and data.

5.2 Annex C presents the innovation loans delivery model (organisational structure), customer journey covering four main stages: marketing, application, agreement and repayment; Innovate UK's processes; feedback from Innovate UK team involved in delivery and monitoring; and feedback from successful businesses.

5.3 Our review of the evidence found that there were clear and well defined organisational structures and arrangements in place to implement the pilot programme. The structures, roles, responsibilities and reporting of the Innovate UK delivery team are generally appropriate and fit-for-purpose. The feedback from successful and unsuccessful businesses on delivery is summarised below. Again, the findings from the successful businesses are generally positive.

A very high level of satisfaction with process from the perspective of the successful businesses

5.4 The main reasons for selecting an innovation loan included: attractive terms and conditions (96% provided a mean score of 4.8 out of 5), lower cost overall, the patient payback period, retention of ownership (as opposed to issuing new equity). Importantly, innovation loans offered greater appetite for risk and a willingness to support firms that traditionally were not able to get finance elsewhere. The case study evidence suggests that innovation loans released the money more quickly than angel and equity investors, and the process was perceived to be more efficient.

5.5 **The businesses interviewed provided positive feedback on the delivery aspects of innovation loans**. Overall, there were very high scores for most elements of the delivery of innovation loans including (Table 5-1): communication with Innovate UK; monitoring of business financials and overall relationship management; transparency of the decision-making process and feedback. The elements that scored lower were the time taken between application and decision; and marketing and promotion. This reflects the relatively narrow range of channels through which the businesses found out about the loans, and the time taken between application and decision. Nevertheless, the scores for these are still very positive. The vast majority (81%) of businesses surveyed considered delivery of innovation loans to be good or very good in comparison with other private sector finance providers.

[51] We completed eight consultations with representatives from Innovate UK and other external consultants involved in the delivery and monitoring of the innovation loans programme.

Table 5-1: On a scale of one to five, where one is very poor and five is very good, how would you rate the following elements of delivery so far?

	Score		
	1 or 2	4 or 5	Mean score
The terms and conditions offered relative to other finance providers	0%	96%	4.8
Communication with Innovate UK throughout	3%	87%	4.4
Monitoring of the business financials and overall relationship management	0%	93%	4.4
Transparency of the decision-making process and feedback	7%	86%	4.3
Monitoring of the project progress	0%	86%	4.2
The application process relative to other private sector finance providers	6%	81%	4.1
The application process relative to other public sector funders	14%	81%	4.0
Time between application and decision	11%	68%	3.9
Marketing and promotion of the loans	9%	71%	3.9

Source: SQW/BMG survey base = 38 cases

5.6 Case study businesses first became aware of innovation loans through multiple sources, Innovate UK's: regional events, blog, mailing list, grant Monitoring Officers, regular updates to the launch of the pilot, businesses' own networks, other (e.g. London Stock Exchange event).

5.7 None of the businesses had sought any professional advice **before applying** for innovation loans. However, one business exploited their personal networks to get insights into the application process, another accessed informal advice from other entrepreneurs, and another engaged with their own internal accountants and legal team to discuss the terms and conditions of the loans. Furthermore, out of the 10 cases, **there was almost equal split between businesses receiving help or support in preparing their applications and those that did not**. A few businesses claimed to have a good understanding of the Innovate UK processes through previous experience, and in one case they would (with hindsight) have used someone to help with the financials. Of the businesses that did receive support, this was from the following main sources:

- External consultant to review application and advise on project plan, budget etc. This was thought to be a significant contributing factor to their successful application.
- Solicitor and accountant support for example to prepare finances for the application/ Part B of the application.
- Bid-writing sub-contractor who reviewed the funding application and provided a second opinion - challenged the figures and assessed the application against the competition scope.

5.8 Annex C (Table C-3) summarises the feedback from the businesses on the delivery of the innovation loans programme. These comments generally reinforce the positive findings presented above for each of the main areas of delivery discussed with consultees. We draw the following points from the feedback presented in this table.

5.9 **Marketing and promotion of the innovation loans** – the relatively lower scores for the marketing and promotion of the loans are reflected in the mixed views ranging from: "excellent" and "modest" to those that wanted to have more information. The **Communication with Innovate UK throughout** was thought to be very strong overall. The bespoke, personalised, proactive, and consistent nature of the communication was highlighted. The direct interaction (face-to-face and other) was valued. In a few cases, the communication was considered better relative to the Innovate UK grants process.

5.10 **The application process relative to other finance providers** – the application process was considered to be comparable if not better relative to private finance providers e.g. 'Series A' applications, private bank loan/ commercial banks. In a few cases the approach of Innovate UK in trying to understand the projects and business was welcomed. In comparison to other public provision, (e.g. Innovate UK grants) the application process was generally deemed better. However, in a couple of cases the process was considered "laborious", "time consuming" and required too much detailed information (especially on finances i.e. Part B of the application).

5.11 **The time between application and decision** was generally viewed as relatively quick – in a few cases the quick speed of processing applications to decision stage was in line with or exceeding expectations. However, other consultees still wanted the applications to be decided even faster. Also, most case study businesses had received **feedback on the application and assessment**. This was mainly verbal and was generally thought to be "timely", "useful", "good and comprehensive". There was nothing that stood out about the feedback process, it was "run of the mill". In the view of one consultee, "it was very refreshing to be able to speak to someone" and that this "demonstrated the greater accountability and transparency within the innovation loans process compared to Innovate UK grants programmes".

5.12 Finally, the feedback on the ongoing support and advice since innovation loans were awarded to businesses was generally positive. The majority of consultees viewed this as either "good", "fantastic", "very commercial", "very supportive and proactive", and generally the right amount or balance. The main area of improvement related to "onerous" monitoring procedures. Despite this, one consultee points out that overall, the process was "transparent– the customer journey ran according to plan". We understand that Innovate UK has taken customer feedback into account in their continuous improvement work during the course of the pilot.

Feedback from the survey of unsuccessful businesses

5.13 A telephone survey of 78 businesses that were unsuccessful in applying for an innovation loan was undertaken. The key results from the survey are presented in section 8. The survey provides some information on the loans process. Table 5-2 shows that:

- communication and the time between application and decision scores relatively highly
- the score for the feedback after the decision and *comparison with other finance providers* were relatively low, although this is an area where unsuccessful businesses are most likely to be critical.

5.14 The results, although lower, are consistent with the pattern found among the successful businesses.

Table 5-2: On a scale of one to five, where one is very poor and five is very good, how would you rate the following…

	1 (very poor)	2	3	4	5 (very good)	All cases
Marketing and promotion of the Loans	6	18	24	22	6	**3.1**
Communication with Innovate UK throughout	14	17	11	29	6	**2.9**
The application process relative to other finance providers	20	19	17	18	2	**2.5**
Time between application and decision	11	10	27	27	3	**3.0**
Feedback and signposting after application decision	20	12	23	19	4	**2.7**

Source: SQW/BMG survey of unsuccessful firms (n=78)

6. Assessment of early outputs and outcomes

Section purpose

This section presents evidence on the outputs and intermediate outcomes of beneficiaries of innovation loans. It draws on evidence gathered from the 38 telephone interviews of businesses that received innovation loans (including 10 case studies).

Summary of key findings

The business survey sample covers all five competitions and is reasonably representative of the population of 69 businesses, although it under represents the fifth open round call. The total of 38 interviews represent 70% of the available sample at the time and 56% of the successful businesses progressed.

Nearly all the businesses had heard about innovation loans directly from Innovate UK (81%), primarily through mailing lists and events. More than half (58%) had used the loan to recruit or train staff, while just less than half (42%) had used the funds to acquire capital equipment/vehicles.

At the time of application, 23 businesses (63%) only applied for the innovation loan. However, 15 businesses (39%) also applied for other sources of funding. Of these 15 cases, 11 (73%) had sought equity (not necessarily as a substitute for the innovation loan), while the reminder had applied for other grants, and commercial loans from banks, building societies and peer to peer lending.

New products, services, and processes – almost a third (12) of the businesses had introduced a new or improved product, service or process (6 introduced new or improved processes). The remainder expected to do so in future. The majority of businesses planned to produce products or services that are new to market.

Moving towards commercialisation/ progression through TRLs – 29 businesses (76%) had already progressed a product/service towards commercialisation; 11 of the businesses had moved their project from validation and testing to scaling; and four businesses had moved from proof of concept to validation/testing.

Increased R&D investment – the loans have significantly increased investment in R&D with the average increase of £414k investment attributed to innovation loans. Applying this average increase to the 17 cases that reported increasing R&D expenditure gives an overall increase of £7.0 million to date.

Intellectual Property (IP) – given the relatively short time since many of the businesses were awarded the innovation loan, there have been a fairly high number of IP applications (14 applied to date and 11 plan to do so in the future).

Processes and productivity – there were six businesses that had introduced new or improved processes to date, and a further 19 expected to do so in the next two years. All believed these processes would reduce costs, and almost all thought it would improve quality and save time. These benefits had occurred for those businesses that had already implemented process changes. Importantly, in almost

two thirds of businesses, the innovation loans have or are expected to support more efficient methods of production.

Follow-on funding – around a third of business have secured follow-on funding to date worth at least £29 million and most attribute this to the innovation loans. Nearly all of it was raised through equity (£21 million within the sample) and a smaller amount, £3.7 million from grant funding.

The findings above are generally supported by the case study evidence. nearly all cited an improvement in their ability to raise private sector finance – it either acted as an endorsement (or 'certification') that helped to de-risk the project for investors or improved businesses' confidence to approach investors. This is reinforced by the very high finance additionality reported, with 95% of businesses stating that they would not have been able to get similar finance elsewhere.

The evaluation evidence suggests that outputs and outcomes are mostly additional – innovation loans have accelerated projects, are larger in scale and higher quality. The pilot is occupying a unique place in the landscape: it funds projects that are too high TRL for grant-funding but too risky for private sector investment.

Profile of case study beneficiaries

6.1 This section draws together the findings from 38 telephone interviews of businesses that received innovation loans. This includes 10 interviews as case studies.[52]

6.2 The sample covers all five competitions and is reasonably representative of the population of 69 businesses,[53] although it under represents the final open round call as the interviews could only be conducted with businesses which had started to drawdown the loan. The total of 38 interviews represent 70% of the available sample[54] at the time and 56% of the total cases now agreed.

Table 6-1: Numbers in the sample and population by competition

	Sample		Population	
	Number	**%**	**Number**	**%**
Comp 1 (Infrastructure Systems)	8	21%	11	16%
Comp 2 (Manufacturing and Materials Readiness)	12	32%	16	24%
Comp 3 (Open round 1)	9	24%	14	21%
Comp 4 (Open round 2)	8	21%	16	24%
Comp 5 (Open round 3)	1	3%	12	18%
Total	**38**	**100%**	**69**	**100%**

Source: SQW/BMG survey base =38, and IUK data

[52] Each of the 10 case study businesses were interviewed twice - first interview after initial drawdown and then follow-up interview.
[53] The population of successful businesses is defined as the 69 loan agreements rather than the 73 letter offers signed. This is because the loan agreements have definitely progressed.
[54] The available sample was 54 successful businesses.

Awareness…Nearly all the business had heard about innovation loans directly from Innovate UK…

6.3 Table 6-2 shows the potential channels and the number of businesses that first heard about innovation loans from each of them. Nearly all (81%) heard directly from Innovate UK in some form. None of the businesses interviewed had first heard from the other sources such as banks, accountants, growth hubs, Enterprise Europe Network (EEN), Knowledge Transfer Network (KTN) or from social media or press coverage.

Table 6-2: How did you first hear about innovation loans?

	Responses	%
Innovate UK	30	81%
Other	5	14%
Gov.uk website	2	5%
Accountant	0	0%
Bank manager	0	0%
Business adviser/ Consultant	0	0%
Catapult	0	0%
Enterprise Europe Network (EEN)	0	0%
Knowledge Transfer Network (KTN)	0	0%
Local Enterprise Partnership (LEP) / Growth Hub	0	0%
Press coverage	0	0%
Social media	0	0%
Word of mouth	0	0%
Total	**37**	**100%**

Source: SQW/BMG survey base = 37 that responded

6.4 Breaking this down further, the Innovate UK sources that were most influential were the mailing list (22 heard about directly from the Innovate UK mailing list) and events (five heard about it from Innovate UK events). The results highlight the dependence to date on Innovate UK's own channels. To some extent with a new programme this would be expected as intermediaries have to build up knowledge about how it works and what type of businesses it suits. We would hope that, over time this changes. Even so, in expanding the programme Innovate UK should consider further how to widen promotion to businesses that they have had less contact with, historically. This could include encouraging intermediaries in the private and particularly the public sector to generate more applications.

Table 6-3: How did you first hear about innovation loans (those that indicated Innovate UK in previous question)?

	N
Their UK mailing list	22
An Innovate UK event	5
Some other way	4
Their blog	0

	N
Their funding competition search	0
Total	**31**

Source: SQW/BMG survey base =30 – includes one case that indicated two responses

All the supported businesses considered themselves to be extensively experienced in R&D and innovation in the three years prior to applying for an innovation loan

6.5 As we would expect all the businesses had experience of R&D and innovation projects. The funding is intended for scale ups rather than newer businesses, or ones new to R&D. Past funding for this R&D frequently came from a combination of Innovate UK grants and the businesses own funds. In a reasonably large number of cases (32%) previous R&D capital had also come from external equity. The ten case studies support this. All had received Innovate UK grants in the past and were building on projects that had previously been supported.

Table 6-4: What sources have you used to fund R&D in the past, prior to receiving the innovation loan?

	n	%
Innovate UK grant/s	31	82%
Business's own funds i.e. retained profits or owner's funds	17	45%
External equity finance	12	32%
Other public grant/s	9	24%
European funding grant/s	7	18%
Loans/overdrafts	2	5%
Research Council grant/s	2	5%
Customer/collaborator funding	1	3%
Base	**38**	

Source: SQW/BMG survey base =38 – includes multiple responses

Use of the loans

6.6 The loans were used for a combination of developing prototypes and pilots, testing, planning and designing products, processes or services. More than half (58%) had used the loan to recruit or train staff, while just less than half (42%) had used the funds to acquire capital equipment/vehicles.

6.7 All the ten case studies had used the loan to cover staff costs, typically to hire the researchers and technicians involved in product testing and development. Half of these also subcontracted inputs where these were too specialist for the business to recruit on a permanent basis. Other examples included the cost of contractual research (8 cases) and additional overhead costs, e.g. materials, supplies (5 cases).

6.8 One case study, an internet-of-things company specialising in sensor communication systems for the energy sector, used the loan for a mix of personnel and capital costs. It covered salaries of engineers who were developing a prototype corrosion test; the costs of materials and

hardware for manufacturing of the prototype; and rent costs of the testing and manufacturing facilities.

Table 6-5: Which of the following activities was your innovation loan intended for?

	n	%
Developing commercially-usable prototypes and pilots	28	74%
Experimental production and testing of products, processes and services	22	58%
Producing plans, arrangements and designs for your products, processes or services	21	55%
Staff recruitment, training or development	22	58%
Acquisition of capital equipment/vehicles	16	42%
Acquiring Intellectual Property	13	34%
Any other purpose	1	3%
Base	**38**	

Source: SQW/BMG survey base =38 – includes multiple responses

6.9 Progress was described by 24 businesses (63%) as on schedule while 10 (26%) were slightly behind schedule. At this stage no projects were well ahead or well behind schedule.

Table 6-6: Is your project progressing as expected?

	n	%
Well ahead of schedule	0	0%
Ahead of schedule	4	11%
On schedule	24	63%
Slightly behind schedule	10	26%
Well behind schedule	0	0%
Total	**38**	**100%**

Source: SQW/BMG survey base =38

Alternative sources and finance additionality

Where businesses had looked at alternative sources of funding for their innovation it tended to be through equity

6.10 At the time of the innovation loan application, 15 businesses (39%) also applied for other sources of funding. The other 23 businesses (61%) only applied for the innovation loan. Of these 15 cases, 11 (73%) had sought equity, while the reminder had applied for other grants, and commercial loans from banks, building societies (2) and peer to peer lending (2). The two cases that indicated that they had applied for "other finance" were applications for European funding through Horizon 2020 and, in one case, by approaching a large pharmacy group.

Table 6-7: What other types of funding did you apply for on this occasion?

	n	%
Equity Finance	11	73%
Government or local authority grants or schemes	4	27%
Loan from a bank, building society or other financial institution	2	13%
Other finance	2	13%
Loan from a peer to peer platform	2	13%
Total	**21**	**100%**

Source: SQW/BMG survey base = 15 cases applied 21 times

6.11 Of the 15 firms that applied for other funding:

- seven were rejected (including four that were seeking equity)
- six reported being offered the full amount of their applications, this included five equity cases and one peer to peer lender
- two were offered a lower amount – these were both firms seeking equity.

6.12 Seen in the context of the 38 interviews, this means that six (16%) reported being offered the alternative source of funding they requested. However, it is also apparent that these tended to be where firms were applying for equity, rather than other sources of loan finance.

6.13 For the eight cases that were offered at least some of the funding requested, the main reasons for choosing an innovation loan were the beneficial terms and conditions, specifically the low interest rate and patient payback period. Innovation loans were seen as less expensive overall (interest rates[55], equity stakes or fees were lower). The terms were described as "exceptionally good - not even comparable to VC funding" – the terms and conditions relative to other finance providers was rated very good by 80% of the businesses. The loan was also preferred because it allowed the business to retain control (as opposed to selling equity).

6.14 One case study company, preferred the innovation loan over other provision in the landscape as described in the box below.

Case study example: alternative funding sources

KwickScreen is an innovative space management solution business. Established in 2009, it has 16 employees and generated £1.2m turnover in the UK in 2018. In the three years prior to applying to innovation loans, it had some involvement in later stage R&D but had no experience of securing external finance (public or private) for R&D. It received a £300k innovation loan in November 2018.

The innovation loan was needed to offset the risk associated with the R&D. It enabled KwickScreen to broaden the scope of its research to include higher-risk, more experimental testing. The funding was used to cover material and personnel costs. The firm had successfully applied to Funding Circle, a peer-to-peer lending platform, but declined the funding because the repayment period would have put pressure on the business's finances and would have inhibited its ability to conduct

[55] A higher interest rate is to be tested in the pilot extension.

further R&D in the future. The innovation loan was described as filling a gap in finance provision.

6.15 Of the seven businesses that were rejected by other sources, the reasons given were either that they had an insufficient business record (4) or that their proposal was not strong enough or too high a risk (4). For these businesses an innovation loan was the only option.

6.16 The feedback generally was that the loans offered very attractive terms, offered a greater appetite for risk and a willingness to support companies that traditionally were too young to be able to get finance elsewhere.

Finance additionality is very high… 95% of businesses interviewed did not think they would have been able to get similar finance elsewhere

6.17 **Of the 38 firms interviewed only one thought that it would definitely be able to get similar finance elsewhere** (Table 6-8). Equity offers are not treated as comparable funding. They serve a different purpose at a different time in the firm's life. The analysis above indicates that **while a small number of firms were considering equity at the time of their application, it was not necessarily as substitute for the innovation loan.**

6.18 The results show that innovation loans pilot is filling the gap in the market and that without it businesses do not believe that there is any alternative. As a result, the R&D and innovation that is being funded is very likely to represent additional activity.

Table 6-8: In the absence of the innovation loan from Innovate UK, do you think you would have been able to obtain similar finance elsewhere for these activities?

	n	%
No, definitely not	23	61%
No, probably not	13	34%
Yes, probably	1	3%
Yes, definitely	1	3%
Total	**38**	**100%**

Source: SQW/BMG survey base = 38 cases

Case study example: finance additionality

Ashwoods Lightfoot, a clean technology company, received a £1m innovation loan to adapt its existing product for a new market. Prior to receiving the loan, the firm's R&D activities were funded by a combination of internal funds and public sector grants. As an early-stage business without an established track record, it was unable to apply for a commercial loan and would also not have received a good valuation for equity investment. The firm, therefore, would not have been able to obtain similar finance from elsewhere. With a greater appetite for risk, the innovation loans programme "*provided a solution that no one else could*."

6.19 **The loan programme was seen as occupying a unique place in the provision landscape**: it funded projects that were too high TRL for grant-funding[56] but too risky for private sector investment. Among these businesses, accessing private sector investment was *"near enough impossible"* and there was a perceived risk of losing autonomy. However, as the survey shows later, a large number of the businesses have gone on to leverage additional private sector investment (angel and equity) as a result of the innovation loan.

6.20 The case studies also found other reasons why there was a preference for the innovation loans programme over other finance. It released the money far quicker than angel and equity investors and the process was perceived to be more efficient. The case studies also highlighted the "softer" benefits of receiving a loan: eight of the 10 cited an improvement in their ability to raise private sector finance – it either acted as an endorsement (or 'certification') that helped to de-risk the project for investors or improved businesses' confidence to approach investors.

6.21 The box below provides some feedback from the case study businesses on how innovation loans compares to private lending and alternative risk finance. The responses suggest the attractiveness of the specific product features and the risk profile associated with the loans. This includes the terms/flexible repayment arrangements; funding "riskier" projects relative to the market; and the process being timely and transparent.

Innovation loans compared to private lending and alternative risk finance

"Innovation loans offered a lower risk to the business than the private sector: the low interest rate and flexible repayment periods provide a lot of flexibility. This gave them reassurance that they could deliver the project at their own pace, that there was leeway for obstacles and that they could maintain ownership of the company".

"It is hugely preferable – interest rates are lower, IUK have a higher appetite for risk, payback period is good. Very pro-business – feels more like an investor than debt approach".

"The terms of repayment were the most significant difference. It gave space to undertake the workplan without extreme pressure and a positive experience of loans that has improved their confidence to access finance".

"Innovation loans is a unique proposition. It has enabled our company to take on loan investment 1-2 years earlier than would have been able to from commercial sources".

"The level of detail required in the application form, particularly part B, is very similar to a Series A funding application. The scrutiny is comparable to other funding they have accessed/applied for. The benefit is that it occupies a "riskier" space than other provision and so has allowed the firm to move closer towards commercialisation".

"Innovation loans is superior because it was timely, decisive, transparent, helpful and supportive. Innovate UK team were very keen to help the business succeed and grow – one thing you cannot put a price on is this big sincerity to help us".

[56] Grant funding is available, but at an intensity level of 45% may be considered ineffective / undesirable.

6.22 Our conclusion is that delivery of innovation loans has been especially good, with a positive relationship being developed with the successful businesses. These results were reinforced by the discussions with the case studies and our own telephone interviews which were almost unanimously positive.

What evidence is there of progress towards the achievement of intended outputs, outcomes and impacts?

Moving towards commercialisation

6.23 A core measure of the effectiveness of innovation loans is whether it has enabled businesses to progress products/services towards commercialisation. One of the challenges is that for some firms the loans have only just started to be drawn down, with the result that the investment and subsequent activities may not yet be underway.

6.24 The survey found that of the 38 cases, 29 (76%) had progressed a product/service towards commercialisation and six expected to. Three did not consider this relevant (Table 6-9). The six other cases did not consider these levels relevant at this stage as it was too early.

Table 6-9: As a result of receiving the innovation loan from Innovate UK, has your business progressed any products/services towards commercialisation?

	Yes	No but expect to in future	Not relevant	Total
Comp 1: Infrastructure Systems	8	0	0	8
Comp 2: Manufacturing and Materials Readiness	8	3	1	12
Comp 3: Open round 1	7	1	1	9
Comp 4: Open round 2	6	1	1	8
Comp 5: Open round 3	0	1	0	1
Grand Total	**29 (76%)**	**6 (16%)**	**3 (8%)**	**38 (100%)**

Source: SQW/BMG survey base = 38 cases

6.25 Of the 38 businesses interviewed, 32 provided data on their starting and latest TRLs. These are used to show how projects have moved towards commercialisation as a result of the loan. Figure 6-1 shows the starting TRL on the left and the TRL at the time of the interview across the top. These go in order from developing basic principles, through proof concept, testing, scaling and finally commercialisation. The chart shows the combinations of the starting and latest positions. Given most are still at a fairly early stage these results are encouraging.

6.26 One of the key findings, is that 11 of the businesses reported as having moved their project from validation and testing to scaling. Four businesses had moved from proof of concept to validation/testing. As the projects progress we would expect more to move towards the final column. At this stage the chart shows only two cases that are considered to be fully commercialised.

Figure 6-1: What stage of development was the technology at when you received the innovation loan and where is it now?

Start TRL	Latest TRL: Developing **basic principles** or formulating the concept	Developing the **proof of concept** or testing in laboratory conditions	Being **validated or tested** in a real but controlled environment	Being tested and **scaled** in an operational environment	Fully **commercialised** and brought to market
Developing **basic principles** or formulating the concept	1	3	3	2	0
Developing the **proof of concept** or testing in laboratory conditions	0	1	4	1	1
Being **validated or tested** in a real but controlled environment	0	0	1	11	0
Being tested and **scaled** in an operational environment	0	0	0	3	1
Fully **commercialised** and brought to market	0	0	0	0	0
Base	1	4	8	17	2

Source: SQW/BMG survey; base of 32 that responded to the question

The loans are significantly increasing investment in R&D

6.27 Businesses were initially asked how much they spent on R&D in the year prior to applying for the loan. Values were provided by 21 companies with an average of £305,000. The extent to which the loans have subsequently enabled increases in R&D expenditure will depend on how much has been drawn down at the time of the interview.

6.28 In the survey, businesses were asked how much *extra* they have invested in R&D, to date, as a result of the innovation loan. A total of 17 businesses reported that they had increased their R&D spend to date. Of these, 14 were able to quantify the increase, estimating an average of £414,000 per business, considerably more than their average R&D investment before receiving the loan.

6.29 Applying this average increase to the 17 cases that reported increasing R&D expenditure gives an overall increase of £7.0 million to date.

Table 6-10: R&D investment as a result of innovation loans

	Value
Average expenditure on R&D prior to innovation loan	£305,000
Average *increase* in expenditure attributed to receipt of the innovation loan	£414,000

Source: SQW/BMG survey – based on 21 cases that provided pre-innovation loan R&D expenditure

6.30 Looking forward, 20 businesses were prepared to estimate the additional R&D investment that their company will make as a result of the innovation loan. A further 10 reported an increase but could not quantify it. The average was just over £1.0 million for the 20 businesses.

6.31 Among the case studies, businesses reported that the innovation loan gave them more confidence in the project, eased cashflow and pushed them to "*take more of a risk*". The reported growth in employment and R&D investment is promising and suggests that beneficiaries are willing to bear some of the risk of future development and will be better placed to increase production, turnover and repay the loan.

Case study example: investment in R&D

Ashwoods Electric Motors, an electric motor manufacturer, had created two new high-skilled R&D jobs by February 2019 and had hired an intern by July 2019. The new employees brought new skills and expertise that were essential to the project's success. The innovation loan enabled the business to pivot its focus from engineering to R&D: where several jobs were split between manufacturing and R&D, six are now wholly focused on research. This improvement in R&D capacity will better place the business to deliver innovation internally and increase its confidence to conduct R&D. In the absence of the loan, it would not have developed its internal R&D capacity.

New products, services and processes

6.32 Almost a third (12) of the businesses interviewed had introduced a new or improved product, service or process. The remainder expected to do so in future. Within this three reported a new product or service; five improved existing products or services; six introduced a new process. In several cases, individual businesses reported combinations of these.

6.33 Over the next two years all the businesses expected to introduce a new or improved product or service. In most cases, this would also include new processes. Of those that responded, all but six businesses planned to produce products or services that could be described as new to market i.e. introduced before competitors.

Case study examples: new products, services and processes

- Ashwoods Electric Motors, an electric motor design and manufacturing business, used the loan to develop a machine to manufacture a new-to-market electric motor to the off-highway vehicle sector that is 70% smaller, 70% lighter and 10% more efficient than currently used motors.
- Ashwoods Lightfoot, a cleantech engineering company, planned to use the funding to apply their service, which uses real-time engine data to change driver behaviour, to reduce fuel consumption and accident rates in the consumer market. They have had proven success in the fleet sector and the loan will enable them to expand into this new market.
- Callaly, a femcare manufacturer, is using the loan to develop automated high-speed production machinery to reduce the cost of their innovative sanitary product, which combines an organic cotton tampon with an organic cotton mini-liner.
- Citi Logik, a network analytics company, is using the funding to integrate its existing deep data mining and AI solutions into a single service platform. This would be the first real-time data analytics engine with a reporting function to be commercially accessible to individuals living in urban areas.

6.34 Some of the examples of the potential customer sectors which will benefit from these innovations are shown in Table 6-11.

Table 6-11: Examples of potential customer sectors reported

Advanced Manufacturing Sector	Chemical	Manufacturing and product design
Aerospace	Consumer sector	Medical devices and optics
Digital	Dairy farming	Offices, universities, schools
Automotive sector	Electric aircraft, electric cars, clean propulsion	Oil and gas
Aerospace	Energy	Retail, pharmaceuticals, finance
Bio-technology	Health care sector and facilities management.	Transport and logistics

Advanced Manufacturing Sector	Chemical	Manufacturing and product design
Entertainment, media, advertising/marketing, travel, sports/leisure	Photonics	Water
Life Sciences and bio-tech	Local authorities, transport companies	

Source: SQW/BMG survey – based on the 38 cases that reported new or improved products or services

Value of new products and services

6.35 Businesses estimated the annual value of turnover from these new products/services within two years of its launch. Twenty-four provided estimates which were made in bands (Table 6-2). Taking the lower values for each of these bands gives a total of £100 million across the 24 cases that provided a figure. The two figures over £10 million are very optimistic within the next two years. If these are adjusted down to £5 million instead, it gives an average annual increase in sales of just less than £2 million per business.[57]

Table 6-12: Estimate the annual value of your turnover from this product/service within two years of its launch

Value of new product sales	Cases	Lower value (£s)	Total value (£s)
£0 to £250k	0	0	0
£251k to £500k	1	250,000	250,000
£501k to £1m	2	500,000	1,000,000
£1m and £5m	15	1,000,000	15,000,000
£5m and £10m	4	5,000,000	20,000,000
£10m to £50m	1	10,000,000	10,000,000
£50m+	1	50,000,000	50,000,000
Don't know	14	-	-
Total	38	-	96,250,000

Source: SQW/BMG survey – based on the 24 cases that reported estimates of the turnover associated with new or improved products or services within the next two years.

6.36 Businesses estimated the proportion of these expected sales that would be exported. In the cases that provided an estimate, the average proportion was 58%.

Processes and productivity

6.37 There were six businesses that had introduced new or improved processes to date, and a further 19 that expected to, in the next two years. All of these cases believed these changes would reduce costs and almost all believed it would improve quality and save time (Table 6-13).

[57] Re-categorising the two larger estimates to £5 million, gives a total of £46.25 million across the 24 businesses that provided estimates. This gives an average of £1.9 million per case.

6.38 This pattern is the same among the six that had already made the changes. They had all reduced costs, while five of the six had each improved quality, saved time and enabled an increase in scale.

6.39 The key point is that this innovation is not just about products and services, but also leads to changes in processes, and directly improves productivity. The survey indicates that in almost two thirds of cases, the innovation loans have or are expected to support more efficient methods of production and service delivery.

Table 6-13: As a result of receiving the finance you have, or expect to, introduce more efficient processes? Will this…

Process benefits	Cases
Reduce costs	25
Improve quality	22
Save time	23
Enable increase in scale of output	21
Other	3
None of these	1

Source: SQW/BMG survey – based on the 25 cases that reported achieved or expected new or improved processes as a result of the loan

Intellectual Property (IP)

6.40 One of the anticipated outcomes of the innovation loans is the creation of new intellectual property. Given the relatively short time since many of the businesses were awarded the innovation loan, the number of IP applications is fairly high. Fourteen have applied to date and a further 11 businesses plan to do so (Table 6-14).

Table 6-14: As a direct result of receiving the Loan from Innovate UK, has your business applied for any intellectual property protection?

Response	Cases	%
Yes	14	37%
No but expect to apply in future	11	29%
Not relevant*	11	29%
Don't know	1	3%
Refused	1	3%

*Source: SQW/BMG survey – based on the 38 cases (sums to more than 100% due to rounding); * IP registration is not always relevant because of know-how / trade secret rather than patent etc. protection*

6.41 More specifically, there have been 11 patent applications made to date and three businesses have applied for trademarks (Table 6-15). A further 10 businesses expect to apply for a patent within the next two years and another nine expect to apply for either a trademark, copyright or licence.

Table 6-15: What types of IP protection have you applied for, or expect to apply for, as a result of the Loan?

Type of IP	Applied for to date	Expect to apply
Patents	11	10
Copyrights	0	2
Trademarks	3	4
Licences	0	3
Other	1	3

Source: SQW/BMG survey – based on the 25 cases that have or expect to apply for IP

6.42 The programme also generated knowledge that led to new IP and licensing applications: one case study business applied for IP for an Internet of Things (IoT) product which would underpin the loans project, another planned to license two sets of IP from a sister company and a third project business registered trademarks. New knowledge and increased capacity helped one electronics manufacturing firm to introduce a more efficient process.

Follow on funding

Around a third of business have secured follow-on funding to date worth at least £29 million and most attribute this to the innovation loans

6.43 The case studies provided examples of how the award of the innovation loan had helped to secure further, follow on funding. The survey asked whether or not further funding had been secured and, if so how much and what type:

- 12 of the 38 businesses had secured follow on funding to date
- in aggregate, £29 million across the 11 cases that provided the value.

Case study examples: leveraging further funding

G-Volution, a clean tech company, secured a £750k contract with the rail sector, which, together with the innovation loan, sufficiently de-risked the project to attract £650k equity investment. The loan provided a third-party endorsement of the natural gas dual engine, and the rail contract demonstrated demand for another area of the business. The private sector contract would have been enough of an endorsement but it is likely that the firm would have had to provide a more detailed business case, or financial history – *"the combination of the loan and the contract meant the investment process went smoothly, with just one it would have taken more work"*.

Callaly, an innovative feminine care business, has attracted over £3m of further equity investment from business angels and other non-institutional investors following the innovation loan. The company's ability to leverage further funding from private investors was attributed entirely to the loan through added *"prestige and credibility"* – particularly important to an early-stage company with less than five years of credit history.

6.44 In terms of the influence of the loan on securing this funding, feedback from the case studies highlighted the credibility that the loan and association with Innovate UK brought to the company and its ability to raise further funding. Table 6-16 shows the responses of the businesses that had raised funding, alongside the aggregate amount raised by these businesses. A large proportion of the follow-on funding raised is attributed to the loan. For £27 million of the £29 million total (91%) the loan was considered to have contributed to a large or considerable extent, or was entirely responsible.

Table 6-16: To what extent did the loan from Innovate UK contribute to bringing in this follow-on funding?

	Cases	Value (£m)
Entirely	2	5.0
To a considerable extent	4	17.6
To a large extent	3	4.1
To a moderate extent	2	2.5
To a small extent	1	0.1
Not at all	0	-
Total	**12**	**29.3**

Source: SQW/BMG survey – based on 12 cases

6.45 Among those that were able to report the sources of this follow-on funding, nearly all of it was raised through equity (£21 million within the sample) and a smaller amount, £3.7 million, has been secured in grant funding. As the previous table showed, this is largely attributed to the award of the loan. The box below provides some examples from the case study interviews on the influence of innovation loans in developing confidence in firms.

Influence of innovation loans on building confidence

"The innovation loan has allowed the company to create a strategy and vision, which adds credibility to the business"

The loan gave the business prestige and credibility, which opened up the doors to investors, suppliers, vendors, peers, customers and new employees.

"I can go around and say the government has trusted us with a £1m loan, and anyone would tell you that was not easy"

Funding immediately removed barrier to Series A funding: it gave the project/company credibility and showed that they were 'loan-ready'. Since accessing the loan, they have attended a Northern Powerhouse VC presentation and are in discussions with a Series A investor.

"The loan gives us reassurance that we can pay back a loan and might encourage us to be less cautious about accessing private sector finance in the future"

"The endorsement of a government-backed loan is more substantial than that associated with a grant because it suggests a degree of de-risking has occurred. The loan has given their business prestige"

"The loan gave the project a third-party endorsement and improved the business' confidence to approach investors"

In two cases confidence was unchanged:

The business has good working relationships with two existing investors and is already comfortable with private sector finance.

"The business remained very cautious about private sector investment and would only access it as "a last resort".

7. Emerging impacts

Section purpose

This section presents the evidence on emerging impacts and additionality. It draws on the feedback from the telephone survey of 38 businesses receiving innovation loans (including 10 case studies).

Summary of key findings

It is too early to objectively assess the net impact that the pilot loans programme has had on turnover, GVA and employment. However, there is evidence of some impacts, particularly on employment. At this stage it reflects the investments in R&D rather than in scaling up production.

The scale of the economic impact will ultimately depend on the extent to which this pipeline of investment converts into new sales and GVA. From the survey and the case studies, we would say that the results are very encouraging. This is supported by the high level of follow on investment which gives confidence about the prospects of significant financial returns. The equity funding also brings the commercial expertise of the investor, further enhancing the business's chances of success.

Total employment at the time of application across all 38 businesses was 652 (17 employees per business on average). At the time of our interview this was 837. These businesses had created 185 new posts. Businesses that received the loan earlier (Infrastructure Systems) have had more time and consequently had grown employment fastest.

76% of the sample reported that employment had increased because of the loan. All the businesses estimated that in three-years' time they would employ more people estimating a further 266 FTEs attributed to the loan.

There has been less impact on turnover to date. Twenty-four cases were able to provide details of their turnover with the highest turnover reported as £4 million and an average of £938,000. In this context, the loans are clearly a very significant sum for all the businesses. In half the cases (where the business reported turnover data) the loan was greater than their turnover in the last year.

Across the sample of 38 cases, 10 businesses reported an increase in sales at this stage while 20 reported no impact yet. The change in turnover attributable to the loans was £2.8 million across the ten cases with an increase.

In most cases, the innovation loan has accelerated projects and/or helped them scale up activity in a way that would not have happened without the loan. There is only one case where one business believed the benefits reported would have been achieved over the same time period and at the same scale and quality.

Taking account of the counterfactual (what would have happened without the loan) and adjusting to reflect the population of 69 loans awarded, we estimate an additional 114 new jobs and £4 million of additional turnover to date.

7.1 This section presents the early impacts that can be attributed to the receipt of the innovation loans among the businesses interviewed. At this stage of the process we would expect to find a reasonable effect on employment, as the loans are used to hire researchers, but it is too early to expect significant effects on the sales and GVA. While there is reassurance that businesses report projects progressing toward commercialisation, it will not be until this translates into sales, productivity improvements and customer benefits, that the programme can be fully assessed.

7.2 One of the intended impacts of innovation loans is to capture direct financial returns through interest income and loan repayments, which may be reduced by losses through borrower defaults. We show information from Innovate UK on early warning indicators for defaults in their credit ratings and borrower activities later in this section.

Employment

Innovation loans are supporting growing businesses

7.3 The analysis starts by comparing the level of employment among the sample of businesses at the time they applied for the innovation loan, and later, at the time they were interviewed. Total employment at the time of application across all 38 businesses was 652 (17 employees per business on average). At the time of our interview this was 837. From the point of applying for the innovation loan to the time of the interview, these businesses created 185 new posts.

7.4 Table 7-1 sets out the details, by competition. It is interesting that the change per case is higher for the first competition, Infrastructure Systems, which has had longer to make an impact, and then in the open competitions, but lower in Competition 2 (Manufacturing & Materials).

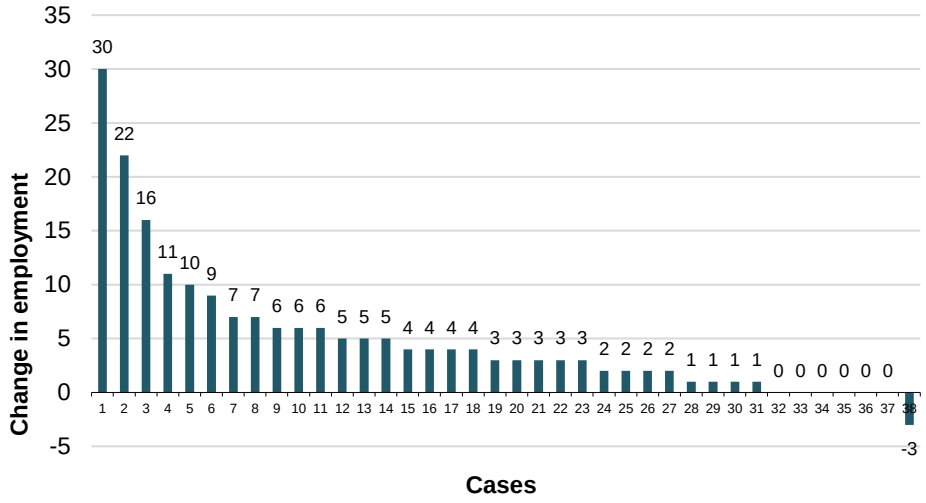
Table 7-1: Number of FTEs supported before and after the loan

Competitions	FTEs before loan	FTEs after loan	Change	Change per case	Cases
Infrastructure	79	134	55	6.9	8
Manufacturing & Materials	234	276	42	3.5	12
Open round 1	133	173	40	4.4	9
Open round 2	176	219	43	5.4	8
Open round 3	30	35	5	5.0	1
Grand Total	**652**	**837**	**185**	**4.9**	**38**

Source: SQW/BMG survey base = 38

7.5 Table 7-1 shows the change in employment reported in each of the cases, ranging from 30 new jobs in one case, to a loss of three jobs in another. The case that reported a loss of 3 jobs occurred where following the loan, research work was subcontracted to an external organisation. So, although the firm employed fewer people directly, employment was created elsewhere.

Figure 7-1: Change in employment between when businesses applied for innovation loan and when they were interviewed



Source: SQW survey

The loans have had a big impact on employment

7.6 Not all these additional jobs are solely a result of innovation loans. In the sample, 29 cases (76%) reported that employment had increased compared to if they had not received the loan. 21% reported that there had been no new employment and in one case employment had fallen.

7.7 Of the 29 cases, 28 were able to estimate the impact of the loan on their employment. Across these cases they estimated that the loan had increased employment by 93 FTE jobs. In the one case where employment had fallen, this was estimated to have been by three FTEs. We know from the case studies and other responses that, at this stage, these jobs tend to be supporting the R&D projects rather than as a result of increasing output.

Table 7-2: Is the number of staff you now employ higher or lower than it would have been if you had not received the loan?

	Number of responses	Number providing an estimate	Number of new jobs
Higher	29 (76%)	28	93
The same	8 (21%)	8	0
Lower	1 (3%)	1	-3

Source: SQW Survey

7.8 All 38 businesses anticipated increasing employment in the future as a direct result of the innovation loan. These businesses estimated that in three-years' time they would employ a further 266 FTEs attributed to the award of the innovation loan.

7.9 The loan enabled one case study beneficiary to increase its employment and upskill its existing workforce to place more emphasis on R&D. The business had hired one new employee in R&D and promoted several existing employees to more senior, technical roles. The change in the

makeup of its employees gave the project traction and will allow the business to introduce a more efficient manufacturing process. The increased efficiency will enable the business to break into new markets, with lower price points. The business expected to achieve more business growth in the future: eight FTEs by 2020 and a further two by 2021.

Early impacts on turnover

7.10 There has been less impact on turnover, at this stage. From the sample of 38 cases, nine did not yet have a full year's turnover and five declined to provide a figure.

7.11 Twenty-four cases were able to provide details of their turnover. All the beneficiaries were small businesses with the highest turnover reported as £4 million and the average was £938,000. In this context, the loans are clearly a very significant sum for all the businesses. In half the cases (where the business reported turnover data) the loan was greater than their turnover in the last year.

7.12 Businesses were then asked whether the loan had helped to generate new sales. Across the sample of 38 cases, 10 reported an increase in sales, 20 reported no impact yet and one believed turnover had fallen. The total change in turnover attributable to the loans was £2.8 million across the ten cases with an increase. In the one case where turnover had fallen, this was estimated as a reduction of £2,000.

Table 7-3: Can you confirm whether your turnover has been higher, the same or lower than it would have been if you had not received the loan?

	Number of responses	Value of new turnover
Higher	10 (26%)	£2.8 million
The same	20 (53%)	-
Lower	1 (3%)	-£2,000
Not relevant/no turnover yet	7 (18%)	-

Source: SQW Survey

7.13 Business were also asked whether they expected future turnover to be higher, the same or lower in the next two years as a result of the loan. Almost all (96%) of the cases thought turnover would be higher within the next two years.

Outcome additionality

7.14 In some cases, businesses may have expected to achieve similar outcomes, without the loan, perhaps through their own or other resources. Outcome additionality is an assessment of the importance of the loan in achieving the reported outcomes. To do this, businesses identified whether these achieved benefits would have occurred anyway, without the innovation loan, or whether they were accelerated, happened on a bigger scale or were of a better quality. The results are shown in Table 7-4.

7.15 In most cases the innovation loan has accelerated projects and helped them happen on a bigger scale. There is only one case where the business believed the benefits reported would have been achieved over the same time period and at the same scale and quality, without the loan.

7.16 This pattern is consistent with the findings from the case studies. These are innovative businesses and regardless of the loan will try to pursue the development of ideas they believe will succeed eventually. The loan enables them to do this by accelerating development, by allowing activity to be scaled up (when it would otherwise have been on a smaller scale) or improving the quality of the development.

Table 7-4: Thinking about the alternative options that were available for the business, would the benefits experienced have been achieved without the innovation loan from Innovate UK

Type of additionality	No. of cases	% of cases
The benefits would have happened anyway, over the same time period and at the same scale and quality, without the loan	1	3%
The benefits would have happened anyway, but they would have taken longer to achieve	26	65%
The benefits would have happened anyway, but at a smaller scale	18	45%
The benefits would have happened anyway, but they would have been of lower quality	11	28%
None of these benefits would have happened	7	18%
Don't know	1	3%
Refused	2	5%

Source: SQW/BMG business survey (number of responses exceeds 40 and 100% as respondents could combine timing, scale and quality additionality)

7.17 **The more detailed questions on timing suggest that projects are accelerated, on average, by between one and two years**. The case studies suggest this can make the difference between success and failure, although this is hard to verify.

Table 7-5: Project acceleration as a result of loan

Accelerated by	Number of responses
Up to 1 year	4
1 or 2 years	12
3 years or more	5
Don't know	6

Source: SQW/BMG business survey

7.18 Comments from the case studies in Table 7-6 below help interpret project additionality further. They show how the combinations of acceleration and scale are integral to maintaining competitive advantage. In one case, a delay of between 6 and 12 months would have resulted in the business "*no longer being a leader in the field, at which point the innovation would be redundant*". Another had successfully tendered a contract with an OEM but would not have been able to bring the product to market in time to deliver the work without the loan. The funding increased the scale of projects, which prevented one business from moving production overseas and allowed a different case to design product with a broader application.

Table 7-6: Project additionality examples from case studies

	Achieved benefits	Additionality
1	Prototyped the product and applied for IP sooner. This has started to build up its case history, which will form an essential part of attracting future customers.	Accelerated by at least 2 years
2	Considerably improved efficiency and increased production capacity: it is now producing three different designs in a facility that was previously only able to make one. The business has hired two engineers and was in the process of hiring a Growth and Operations analyst.	Increased number of products produced from 1 to 3
3	Enabled to explore the possibility of expanding into the consumer market and invest in R&D that they otherwise would not have. Without the loan, opening up the consumer market would have been less likely.	Accelerated project, improved quality and scale
4	Developed highly automated high-speed production machinery and has given the business confidence to invest further in R&D to develop more products. The efficiency savings of the new production facilities have reduced costs and kept production in the UK.	Slower rate, smaller scale and lower quality without the loan
5	More ambitious in its R&D project. The funding allowed the product to be more "*politically neutral and truer to the UK*". In the absence of the loan, it would have had to align its products more closely with international tech giants, like Google and Facebook.	Accelerated project by at least 6 months and Improved the quality of the product
6	The business is now more able to dedicate resource to the R&D project. It hired two new FTE R&D and six marketing and sales staff and had employed a scientist from Imperial College London on a fixed term contract.	Larger scale
7	The project is developing a demonstrator that is giving potential customers confidence in the product. Business can spend more time on R&D and felt *"able to think about what we should be doing, not what we have to"*. Safeguarded between 12 and 15 jobs.	Accelerated by at least 3 years
8	Enabled the project to undertake thorough and more extensive testing of the technology.	Accelerated and increased scale by 50%
9	Introduced a more efficient process that will reduce the cost and time to produce an electric motor, and ultimately meet the appropriate price point for the market. The project was to increase existing market share and would not have gone ahead without the loan. *"We would have had to wait until similarly well-suited grants competition opened, by which point someone else might have beaten us to market"*	Project would not have happened at all
10	Enhanced innovation capacity and skills.	Accelerated project by at least 1 year.

Source: SQW

Scaling up from the sample to the population

Outcomes

7.19 Given the spread of the sample across the competitions, the outcomes are simply scaled up by assuming the sample is representative of the 69 cases. Table 7-7 presents the results from the scaling-up from the sample to the population of successful businesses relating to the key benefits reported.

Table 7-7: Scaling up survey results

	Sample	Estimates for all loans
Progressed products/services towards commercialisation	29 (76%)	53
Increase in R&D investment	£7 million	£12.8 million
Introduced a new or improved product, service or process to date	12 (32%)	22
Applied for any intellectual property protection	14 (37%)	
Follow on funding	12 (32%)	
Value of levered funding	£29 million	

Source: SQW calculations from survey

Impacts

7.20 Scaling up the survey results for the impacts in the population is more complex and uses an adjustment for additionality (Table 7-4). The change in employment or turnover reported by each firm is adjusted depending on their response to the additionality questions. The additionality factors are based on Table D-1 (see Annex D).

- Where the change would have happened anyway, at the same speed and scale the factor and reported change is multiplied by 0%
- Where the loan made it happen faster we use 25% for each year the project is brought forward, i.e. 2 years faster = 50% additionality
- Where it has increased the scale, a follow up question asked about the proportionate change and this is used as the factor
- Where quality is improved we have assumed a 50% additionality factor
- Where the change would not have happened without the loan we assumed that the increase is 100% additional
- Where the respondent does not know we have assumed a 50% factor.

7.21 It is also possible to use combinations of these factors where this is necessary.

7.22 In each case where a firm has reported an increase we have applied the appropriate additionality factor, to produce a net figure for change in employment and turnover (shown in Table 7-8. These net figures are then scaled up in proportion to the size of the sample relative to the population of 69 cases.

7.23 These figures only represent the impacts reported to date and most projects are at too early a stage to see major impacts. On this basis the net additional employment for the population is estimated to be 114 jobs and additional turnover £4.0 million.

Table 7-8: Scaled up impacts

	Sample	Estimates for all loans
Increase in employment	93	169
Net increase in employment (after additionality adjustment)	63	114
Increase in turnover	£2.8 million	£5.1 million
Net increase in turnover (after additionality adjustment)	£2.2 million	£4.0 million

Source: SQW estimates

7.24 Given the interim nature of the report and the early stage of the projects we have not made any adjustments for displacement or spillover effects, which are briefly described below.

Displacement

7.25 Displacement is an allowance that is made in economic impact studies when the new activity created is at the expense of competitors, and therefore is not "additional" at the UK level. A lot of innovation is about the creation of new or improved products and services which will displace older "incumbent" technology. The value of a faster/more reliable product will often accrue to the users (consumers or businesses) through the supply chain and will not necessarily be captured by the company producing it. Because these spillover effects (see below) cannot be measured, it can be misleading to make adjustments only for displacement.

Spillover effects

7.26 Spillover effects are a type of externality that occur where the innovation of one firm affects the performance of other businesses and consumers (positive and negative). Estimating the scale of these types of second order effects is problematic. High level research across industries and countries indicates that spillover effects from R&D investment are likely to be large and positive. There is a range of quantified estimates on the "public return" to investment that ranges from 20% to 100%.

7.27 A review of the spillover literature for BIS by Frontier Economics (2014)[58] provides a good overview of the social return estimates available. It found that studies at the industry level (where social rates of return approximate "national" returns to R&D investment) the social rates of return are **typically around 2 to 3 times as large as the private returns**. Another BIS study (ICF GHK, 2014)[59] concluded that "*the literature does tend to support a conservative position that spillovers add a minimum of 20 percentage points to the direct benefit. However, this is likely to significantly underestimate the true value of spillovers".*

[58] Frontier Economics (2014) Rates of return to investment in science and innovation. Report for BIS.
[59] ICF GHK (2014) *An Economic Analysis of Spillovers from Programmes of Technological Innovation Support* for BIS.

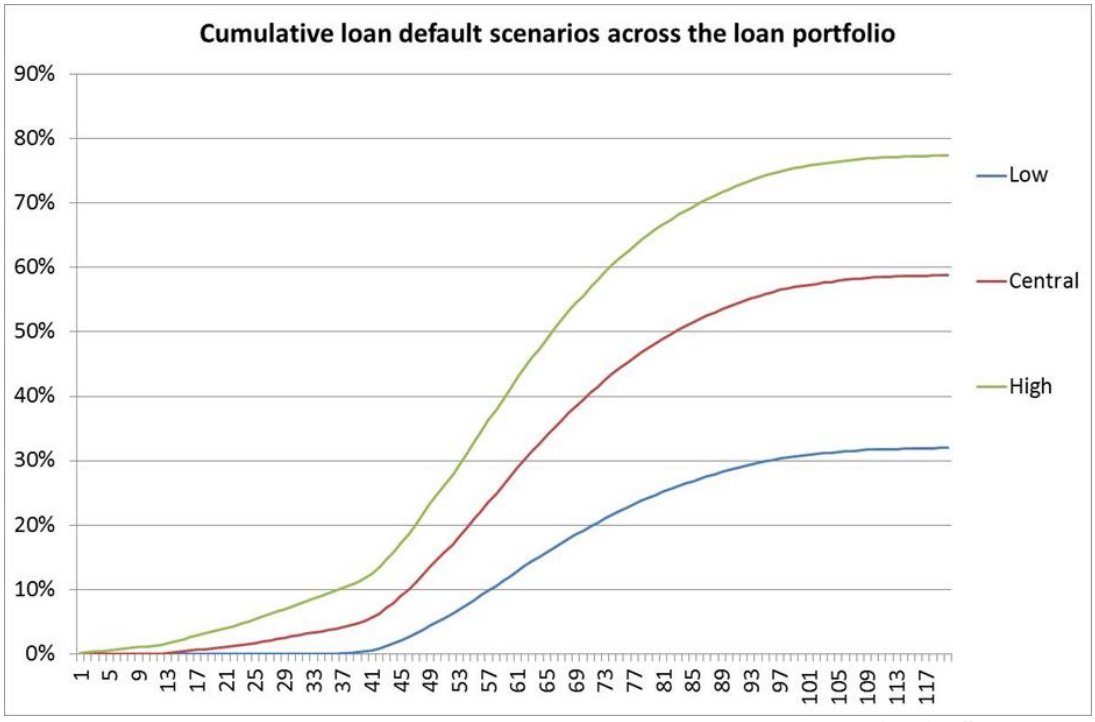
Early warning indicators for defaults

7.28 One of the intended outcomes of innovation loans is to capture direct financial returns through interest income and loan repayments (see Figure 2-1), which may be reduced by losses through borrower defaults over time. The impact of expected losses was an important consideration in the pilot approval process. Innovate UK had not had any late payments or suffered any losses from events of default up to the end of August 2019. Nevertheless, early warning indicators of the probability of defaults may come from initial credit ratings ascribed to borrowers, changes to those ratings at quarterly and annual reviews, and in events such as covenant breaches or breaches of loan terms and conditions. These early warning indicators are discussed below.

7.29 Innovate UK Loans Ltd (IUKL) received interest income of nearly £174k (from the first loan draw down in early April 2018 to the end of March 2019). We understand this income was used to offset some of the costs of delivery of the programme.

7.30 In the original Business Case (2017) for innovation loans, BEIS Analysts, with support from the British Business Bank and independent academics, used data from the Small Firms Loan Guarantee (SFLG) and the Enterprise Finance Guarantee[60] (EFG) schemes (restricted to R&D intensive sectors as a proxy for disruptive technology led innovative businesses) to estimate potential default rates for innovation loans. Figure 7-2 depicts the High, Central and Low cumulative default rate estimates as a key determinant of losses in the Business Case.

Figure 7-2: Cumulative default rate estimates



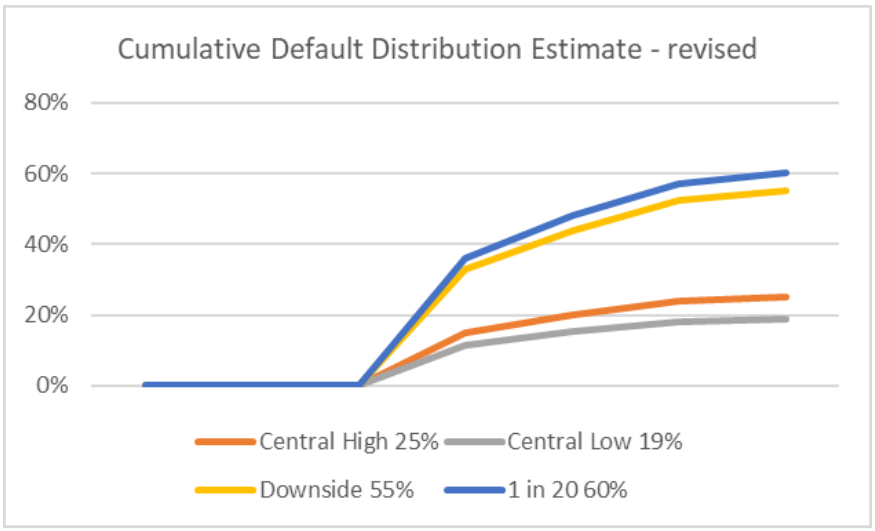
Source: BEIS (2017) Full Business Case

7.31 The Business Case had to make use of data that was historic and based on proxies to estimate the future probability of default since there was no direct comparison available for such a new product. An early indication of the potential defaults can now be made from the actual innovation loans portfolio, based on applications made and the selection criteria implemented

[60] https://www.british-business-bank.co.uk/ourpartners/supporting-business-loans-enterprise-finance-guarantee/

by the Credit Committee of Innovate UK Loans Ltd. Default probabilities and credit ratings are ascribed to borrowers selected from applicants by the Credit Committee. Probabilities of default (PDs) are calculated for each loan transaction ahead of commitment. These are based on a combination of expert judgement – assessed by credit specialists and revised by the Credit Committee – reviewed against industry standard data procured from Moody's RiskCalc.[61] The modal average for the innovation loans portfolio PDs is B+.[62] On the most conservative position (as adopted by the BBB's ENABLE guarantee programme),[63] this equates to forecast defaults of 19% on an average 5-year term. This is significantly below the central case for defaults at c. 60% in the original Business Case. Table 7-3 represents the more recent default profile estimates (2019).

Figure 7-3: Revised default profile estimates



Source: IUKL analysis / Extension Business Case (2019)

7.32 Individual PDs (and equivalent ratings) are reviewed quarterly and annually, with changes (up or down) based on the most recent financial information provided by the business. At underwriting of the loans, the ratings ranged from BBB+ to B-, with an average (mode) of B+. One subsequent downgrade (to CCC) and two upgrades were made at portfolio reviews.

7.33 Events may also be leading indicators of potential defaults. During 2018 / 2019, for example:

- One borrower breached both financial and performance covenants (leading to the above rating downgrade to CCC). This business subsequently rectified those breaches and the previous rating will be reinstated in the absence of any further issues.
- A different borrower, with agreement from IUKL, has obtained additional debt finance from a related party to maintain their financial position.
- Finally, another borrower has notified IUKL of its intention to enter a company voluntary arrangement (CVA) with its creditors following a significant trading

[61] https://www.moodysanalytics.com/product-list/riskcalc
[62] Credit ratings used by IUKL are based on standard industry criteria, using the scale definitions from Standard & Poors. See https://www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/504352 for rating definitions.
[63] https://www.british-business-bank.co.uk/ourpartners/wholesale-solutions/

downturn. Full provision will be made against this debt in IUKL's books pending the outcome of the CVA.

7.34 There may also be early repayment of loans, without penalty, at the request of the business or as a consequence of the terms of the loan agreement, for example through changes in ownership. One borrower has agreed with IUKL to repay their (fully drawn) £1m loan in full by April 2020 after a change of ultimate parent. Another is likely to repay their (partially drawn) £330k loan if an expected acquisition completes in the final calendar quarter of 2019. In both cases, the change of ownership will mean that the business is no longer classified as an SME and, as part of a large corporate group, will no longer be require this form of state aided funding.

Conclusions on economic impact

7.35 Given the relatively short time since businesses started to draw down their loans, we would not expect the innovation to have translated into new sales yet, but the results do show how new employment is being supported as projects move toward commercialisation. The scale of the economic impact will then depend on the extent to which this pipeline of investment converts into new sales and GVA, for businesses.

7.36 At this stage, from the survey and the case studies we would say that the results are very encouraging. This is supported by the high level of follow on investment which gives confidence about the prospects of significant financial returns. The equity funding also brings the commercial expertise of the investor, further enhancing the business's chances of success.

8. Evidence from unsuccessful businesses

Section purpose

This section presents the findings from the telephone survey of unsuccessful businesses (78 respondents).

Summary of key findings

For the unsuccessful businesses (like the successful ones) there were few, if any, alternative sources of funding. Even looking only at the more "investable" cases only a third had been able to find alternative sources of funding. This strengthens the case that the innovation loans are putting additional funds into the market. There was only one case that had found alternative funding after meeting the innovation loans threshold but had been declined on the basis of the credit review.

Where the loans have been made, they have had a significant effect on the timing of R&D and innovation projects. Conversely, where loans were not awarded firms (an indicator of the counterfactual) reported that this has had significant adverse effects on their survival and growth.

The survey evidence shows that despite being unsuccessful, businesses did feel they had strengthened their ability to raise and manage investment - evidence of improved investment readiness and learning.

8.1 A survey of 78 businesses that were unsuccessful in applying for an innovation loan was carried out.[64] While these are not a statistically robust counterfactual, the results do provide a guide to the broader availability of funding for innovation projects. The survey also provides some additional information on awareness of the loans and the process. Of the 78 cases, 77 had been rejected by Innovate UK. Only one business had turned down an innovation loan.

8.2 It is also interesting that almost half (45%) of these applicants had not applied to Innovate UK for funding before. Slightly fewer (41%) had applied and received funding (presumably grants) from Innovate UK in the past (Table 8-1).

Table 8-1: Before applying for an innovation loan, had you previously applied for or received funding from Innovate UK?

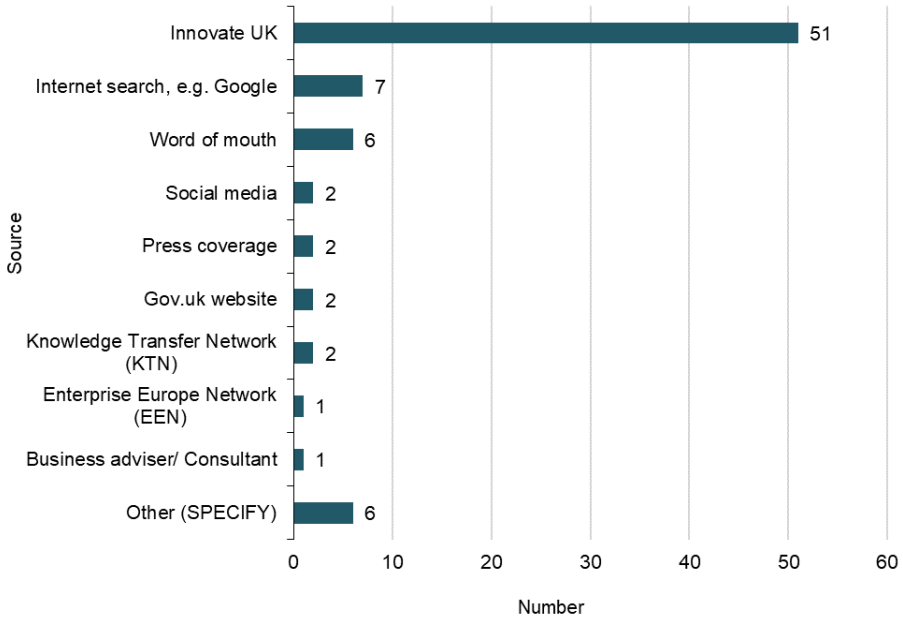
	Number of cases
Yes, applied and received funding	32
Yes, applied but did not receive funding	12
No, not applied	35

Source: SQW/BMG survey of unsuccessful firms (n=78)

[64] It is worth noting that there was a small group of businesses that withdrew their applications during credit analysis or after a loan offer. This group generally accessed alternative finance.

8.3 For these businesses, Innovate UK was by far the most frequent route to finding the loans. The numbers coming through other sources, including KTN and EEN were small (Figure 8-1Figure 8-1).

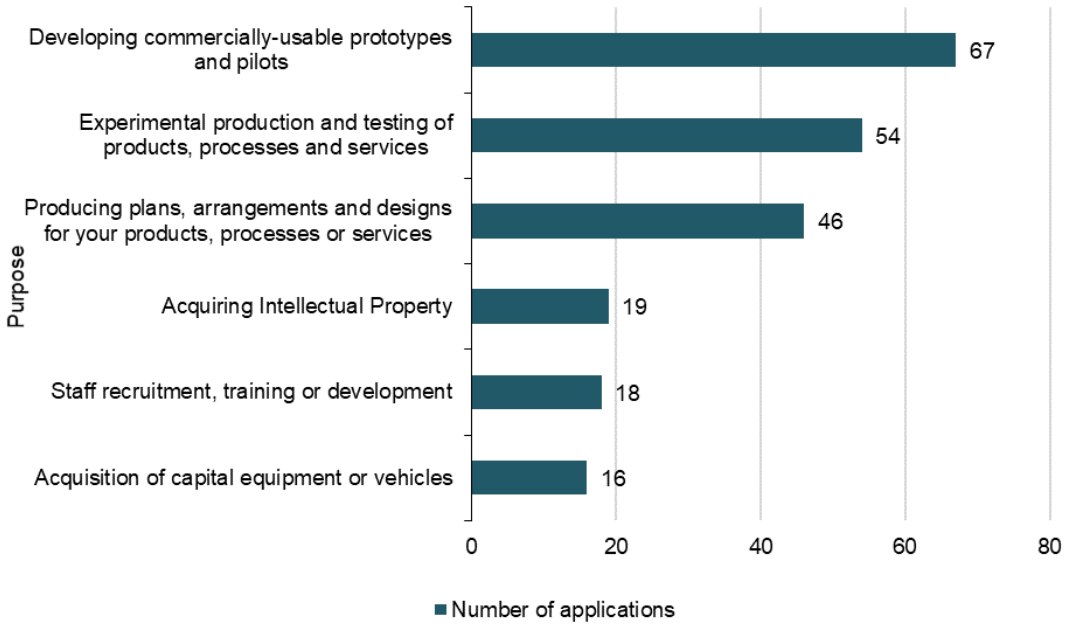
Figure 8-1: How did you first become aware of the innovation loans?



Source: SQW/BMG survey of unsuccessful firms (n=78)

8.4 Most of the unsuccessful applications were for developing commercial prototypes and pilots and for experimental production and testing. Fewer were for purchasing equipment or for hiring staff.

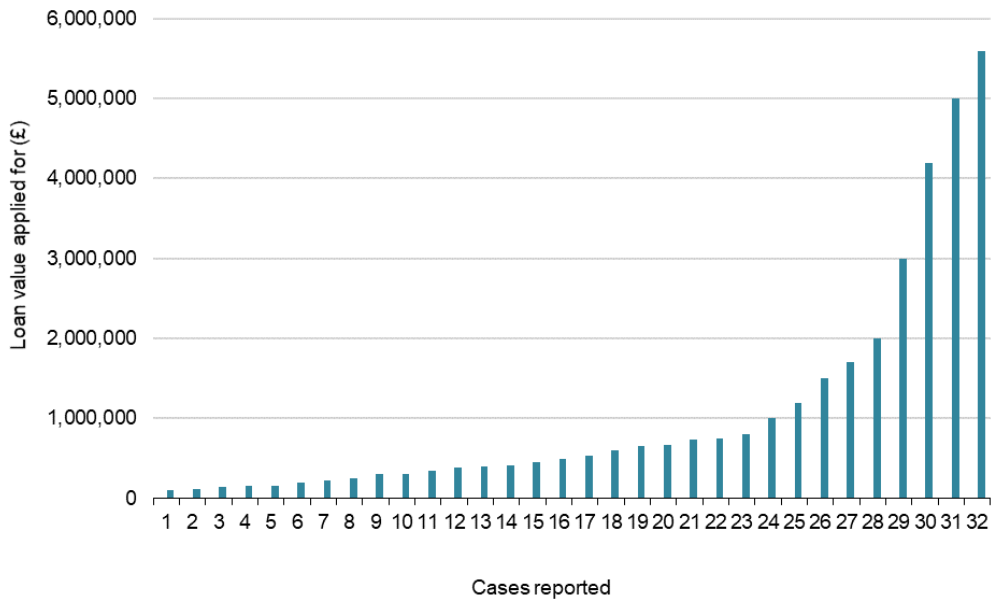
Figure 8-2: Which of the following was your innovation loan intended for?



Source: SQW/BMG survey of unsuccessful firms (n=78)

8.5 Most of the unsuccessful applications were not intended to be part of a wider package of funding (45 stated "not part of a package" and 33 stated "yes, part of a package"). Figure 8-3 shows the distribution of the **total funding from all sources** sought - across 32 cases that provided information. **Three quarters were less than £1 million with a small number of larger sums**.

Figure 8-3: How much finance were you seeking IN TOTAL for these activities, including the innovation loan?



Source: SQW/BMG survey of unsuccessful firms (n=32)

Additionality

8.6 An important question for unsuccessful businesses is whether or not they were able to secure funding from other sources. Of the 78 cases, only a third were able to find alternative sources to fund these activities.

Table 8-2: Have you received funding from other sources, to finance the activities that were described in your innovation loans application?

	%	Number of cases
Yes	31	24
No	69	54
Total	**100**	**78**

Source: SQW/BMG survey of unsuccessful firms (n=78)

8.7 Taking this a step further we also asked whether they were able to secure the full amount required. Of the 24 cases only 7 (9% of the total) had received the full amount they required. It suggests that very few of these unsuccessful businesses were able to find alternatives and strengthens the case that the loans are putting additional funds into the market.

8.8 By definition, these are unsuccessful cases so are likely to be less attractive to investors (than those that were funded). This means they are not a very robust control group. But, we can

examine this further by looking specifically at what happened to those that passed Innovate UK's assessment and IUKL Credit Reviews.

8.9 There were 69 cases identified in the Panel Assessment sheets (that provide data on their scores). **Of these, six had an assessment score of over 70 and passed the initial credit review**, but were not given loans. From this small sample, two had subsequently been able to find alternative funding, while four had not. Given that these are closest to the profile of the successful businesses they provide a better indication of additionality i.e. two thirds (66%) of these cases were not able to find other sources.

8.10 Another key group are those that passed the assessment score, but were turned down on the basis of the credit review, but subsequently got funding elsewhere. This might indicate that other funders were willing to take more risk. There were 15 of these cases that had an assessment score of over 70 but failed the credit review. Although three had gone on to receive some funding only one case had gone on to get the full amount from an alternative source.

8.11 The evidence on additionality from these cases supports the hypothesis, that even among cases that had strong innovation and credit scores, few were able to secure funding from other sources.

What has been the effect on those not securing an innovation loan?

8.12 The effect of not receiving the innovation loan is also an indicator of the counterfactual. The results in Table 8-3 show that **businesses consider the failure to secure a loan to have had very significant effect on performance**. A third considered that it has put business survival at risk. Two thirds (64%) believed it had slowed down or held back growth.

Table 8-3: As a result of NOT securing finance from the innovation loan, what has been the effect on your business's development? Please give one answer from the following

	%	No of cases
It has made no real difference	3	2
It has partially slowed down growth	24	19
It has considerably held back the growth	40	31
It has put business survival at risk	33	26
None of these	1	1
Total	**100**	**78**

Source: SQW/BMG survey of unsuccessful firms (n=78)

Building finance confidence

8.13 Finally, there are some potential benefits from unsuccessful firms' engagement with the Loans programme: 37% of the firms considered the process to have raised their ability to make the case for investment and 24% had greater confidence in their ability to raise finance in the future, as a result of applying.

8.14 There is evidence here that, even among the unsuccessful cases, the loans are playing a role in strengthening the ability of firms to raise and manage investment.

Table 8-4: Building finance confidence

	Yes	No	Don't know
Do you feel that applying to innovation loans has led to you having greater confidence in your ability to raise finance in the future?	19 (24%)	54 (69%)	6 (7%)
Do you feel that applying to innovation loans improved your ability to make your case for investment?	29 (37%)	45 (58%)	5 (5%)

Source: SQW/BMG survey of unsuccessful firms (n=78)

9. Conclusions and lessons

9.1 The innovation loans pilot programme is delivered by Innovate UK. This evaluation covers five competitions for applications, commencing in November 2017. The pilot supports SMEs that want to scale up and grow with loans for late-stage R&D projects that have a clear route to commercialisation. This is across a range of technologies, sectors and markets.

9.2 The overall objective of the interim evaluation was to assess the delivery of innovation loans and to make an early assessment of progress towards intended outputs and outcomes. In doing so it provides the opportunity to evolve and refine the policy and its implementation for scaling up/wider roll out. Specifically, the interim evaluation addresses the five evaluation questions presented in section 1 (Table 1-1).

9.3 The study gathered and analysed evidence from telephone interviews of successful and unsuccessful applicant businesses, case studies, programme documentation and monitoring data. The business survey covers all five competitions and is reasonably representative of the population of 69 businesses that had completed loan agreements at the time of the survey work. A total of 38 interviews with successful businesses were completed (70% of the available sample at the time and 56% of the successful businesses progressed).

9.4 The conclusions, based on an analysis of the evidence gathered, are presented below. These should be interpreted as interim given the relatively short timeframe since the businesses started to draw down the loans. Nevertheless, the evidence at this stage is very positive.

Interest and demand for innovation loans

9.5 **Interest in, and demand for, innovation loans has been satisfactory overall.** The pilot received 393 applications seeking £200m in funding, representing four times the level of capital available for commitment. Although demand in the first two competitions was slower than anticipated (the initial competitions were quite narrow in scope) the later, open competitions have attracted greater demand. The fifth competition received more than double the number of applications than the first.

9.6 According to the full Business Case (2017) the pilot aimed to deliver a target of 100 loans, worth up to £50m, over a two-year period (by spring 2019). **To date, 73 offers have been made and, of these, 69 loan agreements have been signed**. The open competitions have made a big difference. The average loan value was nearly £700k compared to £500k estimated in the innovation loans Business Case (2017).

9.7 The applications and awards have been made to business across sectors. The top four regions for signed loan agreements were: Greater London, South West, South East and North West. The Innovate UK team have made considerable efforts to promote the programme outside London and the South East.

9.8 The applications covered a range of projects from artificial intelligence, internet of things to advanced robotics. The most common project areas were process and manufacturing design technology; smart infrastructure; electronics, sensors and photonics; and energy efficiency.

Assessment of delivery

9.9 There are clear and well defined organisational structures and arrangements in place to implement the pilot programme. The structures, roles, responsibilities and reporting of the Innovate UK delivery team are generally appropriate and fit-for-purpose.

9.10 Overall, the businesses interviewed provided positive feedback on the delivery of innovation loans and the vast majority considered delivery of innovation loans to be good or very good in comparison with other private sector finance providers. The customer journey from marketing, through the application, agreement and loan drawdown have worked well. Communication with Innovate UK throughout, the monitoring of business financials and transparency of the decision-making process, all received positive feedback. The elements that scored slightly lower were the time taken between application and decision, and marketing and promotion. Nevertheless, the scores were still very positive.

Assessment of early outputs, outcomes and impacts

9.11 Nearly all the businesses heard about innovation loans directly from Innovate UK (81%), and primarily through their mailing lists and events.

9.12 At the time of application, 15 of the businesses (39%) also applied for other sources of funding. Of these, 11 (73%) had sought equity (not necessarily as a substitute for the innovation loan), while the remainder had applied for other grants, and commercial loans (including peer to peer lending).

9.13 The following early outputs and outcomes were reported by businesses.

- **New products, services, and processes** – almost a third (12) of the businesses had introduced a new or improved product, service or process (six introduced new or improved processes). The remainder expect to do so in the future. The majority of products and services are new to the market.
- **Increased commercialisation/ progression through TRLs** – 29 businesses (76%) had progressed a product/service towards commercialisation as a result of the loan; 11 had moved their project from validation and testing to scaling; and four businesses had moved from proof of concept to validation/testing.
- **Increased R&D investment** – the loans have significantly increased investment in R&D with the average increase of £414k investment attributed to the loan. Applying this average to the 17 cases that reported greater R&D expenditure gives an overall increase of £7.0 million to date.
- **Intellectual property** – given the relatively short time since many of the businesses were awarded the innovation loan, there have been a high number of IP applications (14 applied to date and 11 plan to do so in the future).
- **Processes and productivity** – six businesses had introduced new or improved processes to date, and a further 19 expect to do so in the next two years. All believed these processes would reduce costs, and almost all thought it would improve quality and save time.

- **Follow-on funding** – around a third of business secured follow-on funding worth at least £29 million and most attribute this to the innovation loans. Nearly all of it was raised through equity (£21 million within the sample) and a smaller amount, £3.7 million from grant funding.

9.14 The findings above are supported by the case study evidence. Nearly all cited an improvement in their ability to raise private sector finance – it either acted as an endorsement (or 'certification') that helped to de-risk the project for investors or improved businesses' confidence to approach investors.

9.15 The survey of unsuccessful businesses provides further evidence of the challenges that firms face in accessing innovation funding. Even among the small number of cases that passed the Innovate UK threshold and the credit review, only a third were able to find funding from alternative sources. Those that had not been successful were also clear that the failure to secure an innovation loan had been detrimental to the businesses' development.

9.16 Overall, the evaluation at this stage indicates that the innovation loans pilot is associated with very high finance additionality with 95% of businesses stating that they would not have been able to get similar finance elsewhere. Innovation loans have accelerated projects, helped increase their scale and/or raise the quality of what is done. The pilot is occupying a unique place in the landscape – funding projects that are too high TRL for effective grant-funding but too risky for private sector investment.

Emerging impacts

9.17 It is still too early to assess the net impact of the programme on business turnover and GVA, although there is evidence of new employment. At this stage this is associated with the investment in R&D rather than in scaling up production or other commercial activities.

9.18 The scale of the economic impact will ultimately depend on the extent to which this pipeline of investment converts into new sales and GVA. From the survey and the case studies, we would say that the results are very encouraging. This is supported by the high level of follow on investment which gives confidence about the prospects of significant financial returns. The equity funding also brings the commercial expertise of the investor, further enhancing the businesses' chances of success.

9.19 The **employment impacts** reported by businesses were as follows:

- 652 employees across all 38 businesses at the time of application (17 employees per business on average), increasing to 837 employees at the time of our interviews
  - ➢ these businesses had created 185 new jobs.
- businesses that received the loan earlier (Infrastructure Systems) have had more time and consequently had grown employment fastest.
- 76% of the businesses reported that employment had increased because of the loan.
- all the businesses estimated that in three-years' time they would employ more staff estimating a further 266 FTEs attributed to the loan.

9.20 The **turnover impacts** reported by businesses were as follows:

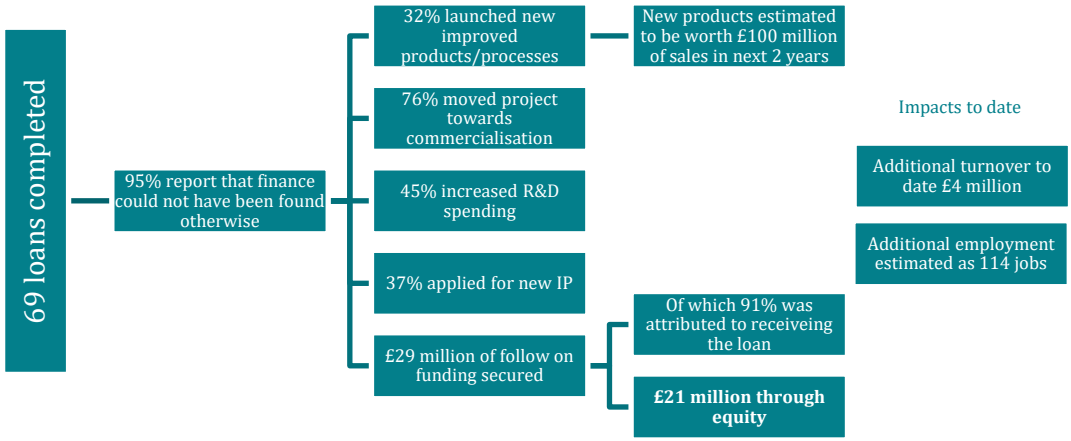
- 24 businesses provided details of their turnover with the highest turnover reported as £4 million and an average of £938,000. In this context, the loans are clearly a very significant sum for all the businesses. In half the cases (where the business reported turnover data) the loan was greater than their turnover in the last year.
- Across the sample of 38 cases, 10 businesses reported an increase in sales at this stage while 20 reported no impact yet. The change in turnover attributable to the loans was £2.8 million across the ten cases with an increase.
- In most cases, the innovation loan has accelerated projects and/or helped them scale up activity in a way that would not have happened without the loan.

9.21 Taking account of the counterfactual (what would have happened without the loan) and adjusting to reflect the population of 69 loans awarded, we estimate an additional 114 new jobs and £4.0 million turnover to date.

Summary

9.22 Figure 9-1 summarises the key outcomes and impacts from the innovation loans pilot

Figure 9-1: Summary outcomes



Source: SQW

9.23 The early evidence suggests that the innovation loans pilot programme has implemented activities as set out in the logic model. These activities include marketing to stimulate interest, applications and take-up, application assessment and due diligence. A theory of change is evident, with the range of activities leading to outputs and outcomes such as additional investment in R&D; progression through TRLs; securing follow-on funding (mainly from private sources). As a result, there are signs of emerging impacts in terms of additional jobs and turnover. Most businesses are expecting greater outcomes and impacts in the future. There are other contributory factors to achieving the benefits reported, mainly firms' own commitment to progressing projects, and sector developments. However, the innovation loan was considered the "important" or "critical" contributory factor to achieving benefits.

Lessons learned

What worked well

9.24 Overall, the interim evaluation evidence suggests that the loans programme has been working well and beneficiaries are very satisfied with their experiences to date. We highlight the following strengths of the pilot programme.

- **The customer journey including the application process was well structured, clear and transparent**: businesses understood what was expected of them at each stage and generally valued the prompt decision making.
- **Communication and bespoke support from the innovation loans team** was seen to be more personal than what was on offer in the private sector and in other grant funding programmes. Businesses referenced *"support that [went] beyond just lending money"* and described Innovate UK staff as knowledgeable, helpful and "*[wanting] to see the project succeed…you don't get that proactive attitude in the private sectors – it's refreshing"*.
- **Innovate UK's willingness to fund high-risk and late-stage R&D projects** that were typically unsuitable for private sector finance. The loan characteristics – repayment period, flexible payments, lower interest rates – were well-suited to businesses.

…and less well

9.25 The evaluation highlights areas of the programme that were working less well, which can be summarised into the following suggested improvements.

- Further promotion of innovation loans to finance and business intermediaries – public and private - this is part of a wider issue for Innovate UK/government funding.
- Consider further co-ordination and integration between innovation loans and other Innovate UK funding (including grants) and programmes to accelerate project commercialisation.
- Analysis of the monitoring data suggests that demand (and awards) are concentrated in London and the South East. Given the finance challenges in other regions, Innovate UK should continue to look at how this can be addressed.
- The loan terms were clearly seen as very attractive and the findings support the decision to increase the interest rate in future. It will be important to monitor demand under the new terms.

Annex A: Consultee list

Table A-1:Case study businesses

Business	Competition
3-Sci	First
Ashwoods Lightfoot	First
CitiLogik	First
G-Volution	First
Ashwoods Electric Motors	Second
Callaly	Second
Advanced Electric Machines	Second
KwickScreen	Second
Valuechain	Third
Parcel Vision	Third

Source: SQW; case studies involved two rounds of interviews (initial and follow-up)

Table A-2: Early review of delivery process - list of consultees

Consultee	Role	Organisation
Alexis Blades	Competitions Portfolio Manager	Innovate UK
Lynne McGregor	Innovation Lead	Innovate UK
Joshua Sheppard	Leading Operations Manager	Innovate UK
Tony Murray	Monitoring Officer	Contractor to Innovate UK
David Milverton	Monitoring Officer	Contractor to Innovate UK
Janet Mitchell	Innovation Assessor	Independent
Catrin Dilloway	Credit Specialist	Innovate UK Loans Ltd
Andrew Wade	Credit Specialist	Innovate UK Loans Ltd
Gary Pennington	Lending Admin Partner	Growth Company Business Finance

Source: SQW

Table A-3: Early review of non-applicants - list of intermediary consultees

Consultee	Organisation
David Walsh	Dorset County Council
Denise Barlow	Solent Growth Hub
Samantha Bell	West of England Growth Hub
John Stenhouse	Signpost 2 Grow: Greater Cambridge/Greater Peterborough Enterprise Partnership
Kirsten Masson	Enterprise Europe Network
Alison Munro	Scottish Enterprise
Monika Dabrowska	MSC R&D Consultancy
Robin Mthawanji	GrantTree

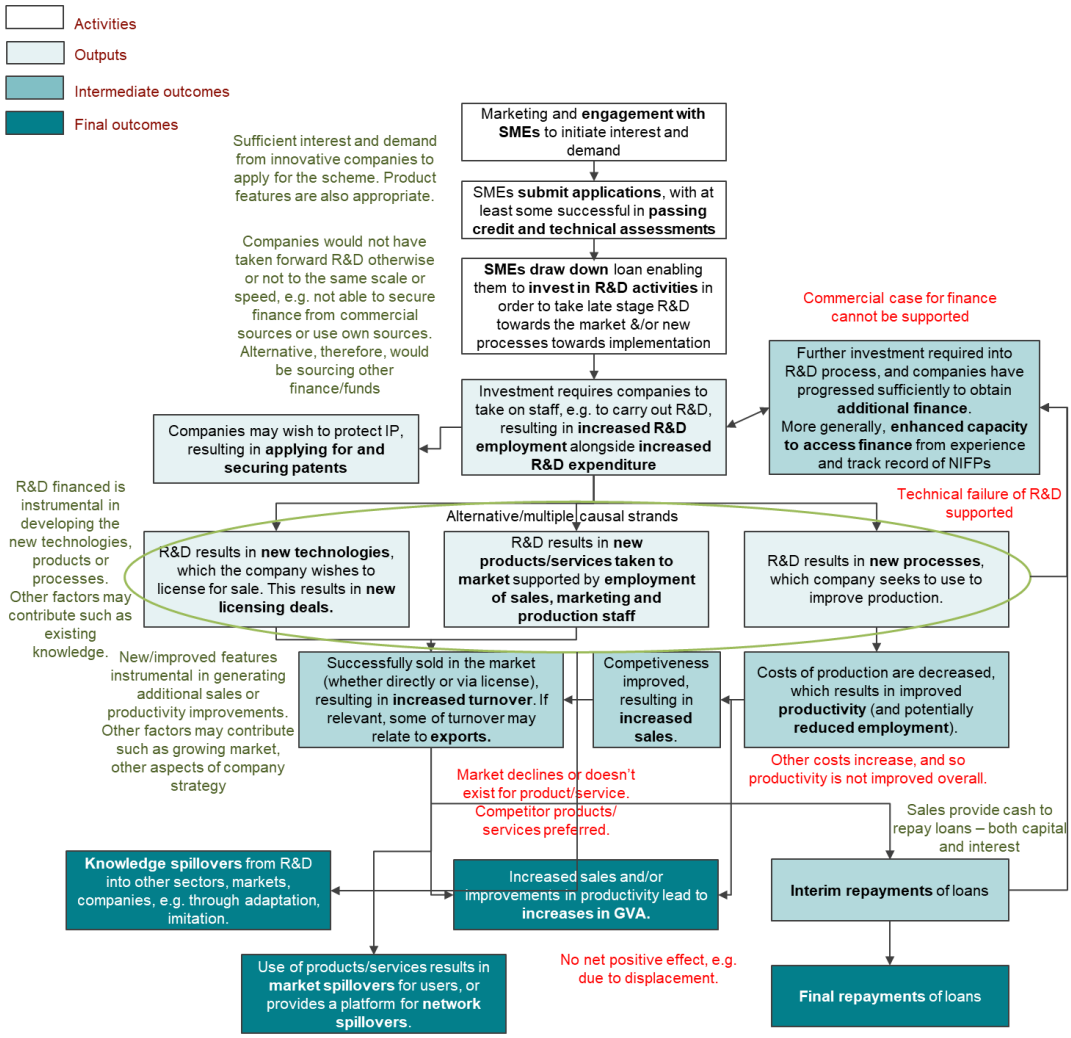
Consultee	Organisation
Will Cooper	GrantTree
Jane Galsworthy	Oxford Innovation

Source: SQW

Annex B: Theory of Change

B.1 An illustrative theory of change was developed as part of our scoping work and re-produced in below and then described below the diagram. This sets out how the different routes from the activities translate into outputs, outcomes and impacts. The theory of change demonstrates the complexities between activities and impact (as there may be multiple and/or alternative causal routes); hence it is important for the evaluation to test attribution given the numerous other contributory factors that could cause effect.

Figure B-1: Routes to outcomes to illustrate theory of change



Source: SQW; the boxes and arrows set out the different potential routes to outcomes. The routes are accompanied by further narrative, with the green text setting out key assumptions and other potential explanatory factors for effects, and the red text providing reasons as to why the theory of change may not occur.

B.2 Marketing and engagement activities are likely to stimulate interest and demand, resulting in applications for new innovation loans, with a portion of firms successful. The innovation loan will enable companies to take forward innovation projects that may not have happened otherwise, or at a greater speed, scale and quality than would have been the case without support. This may constitute R&D expenditure and may require taking on/retaining R&D staff or other staff as part of sales or marketing. Innovation loans seek to support later stage R&D,

moving from proven concept or minimum viable product (MVP) to full customer adoption and the capability to deliver at a price point that is sustainable. Discovery of the appropriate value proposition and business model is an important part of pre-commercial activity. Subsequently, goods or services may be launched into the market or launched more widely, and this again may require further employment creation if this cannot be met by internal capacity. If the products are successful, then this will result in additional turnover directly within the company, some of which may be exports (if sales are overseas). The additional output reflects a contribution to GVA for the economy, thereby meeting growth objectives of new innovation loans, but will be partly offset by displacement effects, i.e. the contribution to GVA of the counterfactual use of the same resources (capital and labour) that were used (in the state of the world with the policy) to create the additional direct GVA in the company.

B.3 Alternatively, the loan will be used by companies to develop new or improved processes, to scale up manufacturing processes or deliver full software as a service capability in order to deliver innovations that meet customer needs at a sustainable price point. The R&D expenditure and employment route is similar to that of a new product. A successful process innovation may improve the productivity of the company, which may mean cost reductions and/or employment reductions, or may involve improvements to the 'quality' of products in some way. These effects may improve the competitiveness of companies, enabling them to increase output for the same inputs.

B.4 There are reasons why the outcomes may not occur or would have occurred at a lower scale, speed or quality. For example, R&D expenditure may not increase if later-stage R&D is substituting earlier-stage R&D; and employment effects may not be seen if R&D employment is replaced by employment in other functions. However, compared to unsuccessful applicants, R&D expenditure or employment may still be higher.

B.5 Alternatively, the innovation project funded by the loan may be insufficient to lead to the adoption of a new or improved product or process: further stages of R&D may be necessary before commercialisation and this may require additional finance. The attraction of additional finance from commercial sources may provide an indication that the finance is helping companies to bridge the 'valley of death'.

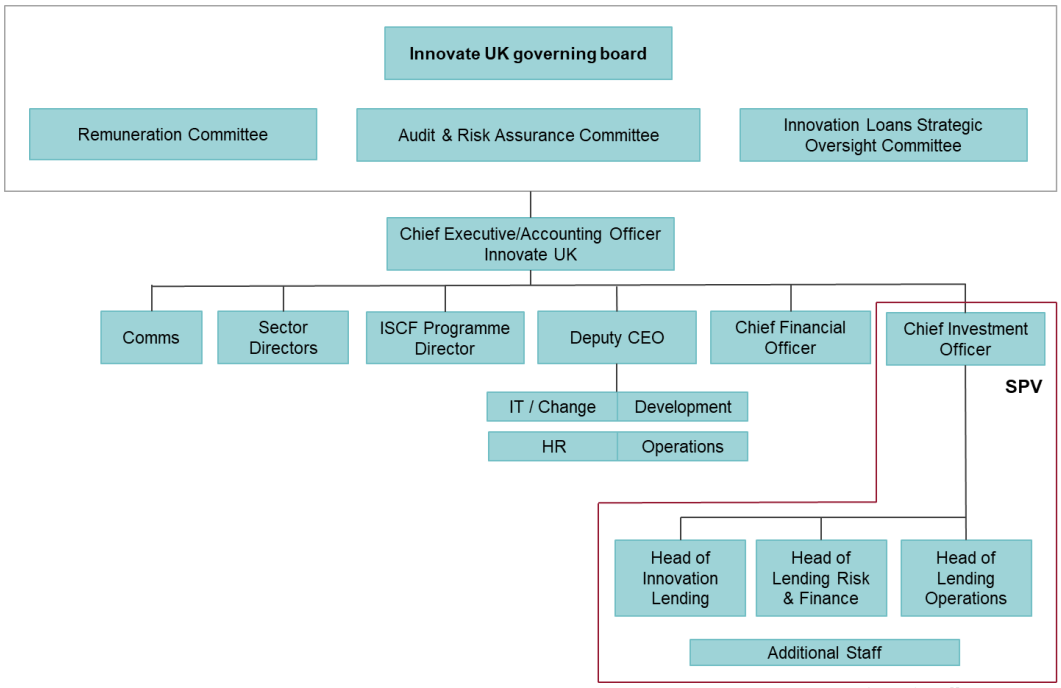
B.6 The theory of change also identifies spillover effects. The process of innovation may generate new knowledge within direct beneficiaries, though this may diffuse to other organisations in the economy, particularly in the same value chain (suppliers and customers) or the same industry. Where this is part of a monetary transaction, it is a direct effect; where it is otherwise, e.g. knowledge moving with people changing jobs, it is an indirect spillover effect, i.e. a positive externality. Diffusion should encourage the take-up of products, or the adoption of new processes may have market effects as users derive some of the benefits. Network spillovers may occur in some instances if the new innovation provides a platform for further innovations.

Annex C: Innovation loans delivery model and feedback

Delivery model

C.1 The innovation loans organisational structure design is presented in Figure C-1. This governance arrangement was developed in partnership with UK Government Investments (UKGI) and in consultation with HM Treasury, BEIS, and the British Business Bank (BBB). Although changes have been made in practice, partly as Innovate UK has become part of UK Research and Innovation, the core structure remains as approved in the Business Case.

Figure C-1: Innovation loans organisational structure



Source: BEIS (2017) Full Business Case

C.2 The key points to note from the organisation structure above are as follows.

- The **Strategic Oversight Committee** (SOC) provides challenge and additional assurance that: the parameters of the pilot are appropriate and represent value-for-money (VfM); financial and risk management controls as well as underwriting processes are in place. This Committee has become the Innovate UK Council Innovation Finance Sub-Committee, with substantially the same terms of reference and membership as the original SOC.
- A **Special Purpose vehicle (SPV)** (Innovate UK Loans Ltd) is set-up as a wholly owned subsidiary of UK Research and Innovation to deliver the programme. The advantages of using a SPV, as highlighted in the Full Business Case (2017), include:[65]
  - ➢ isolated financial risk and increased transparency

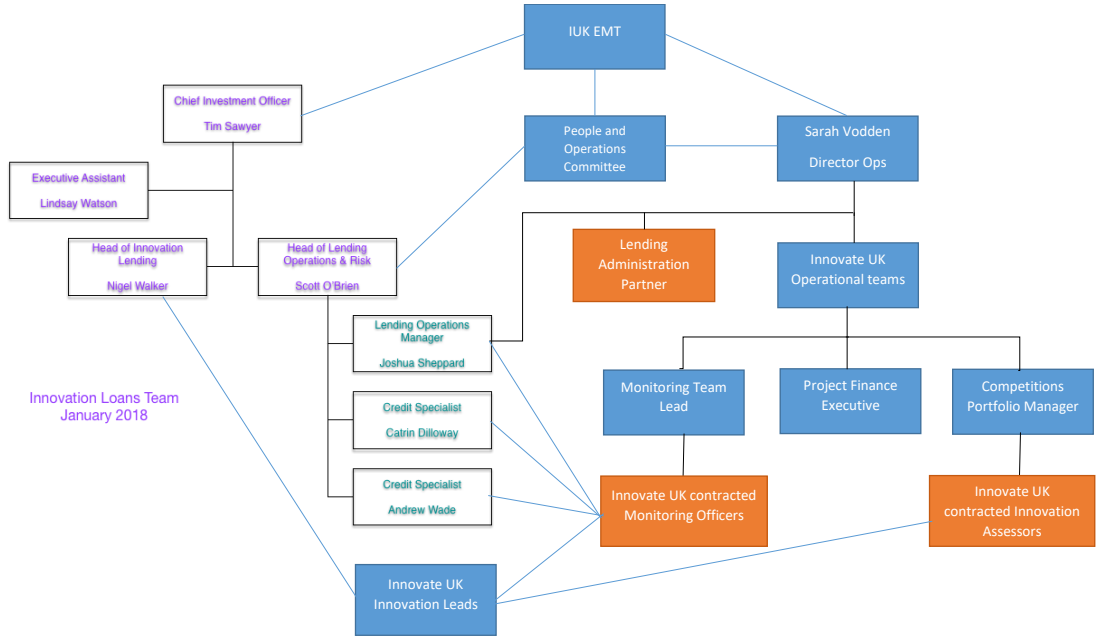
[65] The SPV operational model was based on independent work undertaken by Oliver Wyman LLP.

- greater transparency of costs (loan finance from grant finance)
- clear lines of accountability and responsibility
- independent and experienced governance
- right expertise is easier to attract
- portability i.e. easier to move, sell off or reduce public ownership on the loan book.

- The **Executive Board** (EB) of the SPV is responsible for achieving the innovation policy objectives - determining the lending, underwriting and operating policies, and management of risk. It also determines how decisions on loan applications are made, as well as developing recovery and write off policies and procedures.
- The leadership team comprises the Chief Investment Officer, Head of Innovation Lending and the Head of Lending Operations and Risk. These three executives also constitute the Credit Committee of Innovate UK Loans Ltd which makes final lending decisions.

C.3 Within the overall organisational structure described above, Figure C-2 illustrates how the innovation loans delivery team is set-up. This was provided by Innovate UK following our request. The organisational chart below maps the connections between the innovation loans team and the Innovate UK operational teams.

Figure C-2: Innovation loans organisational map



Source: Innovate UK

C.4 In interpreting the above chart, the following key aspects are worth highlighting.

- All the operational teams have their own direct lines of management which are not fully shown in this diagram.

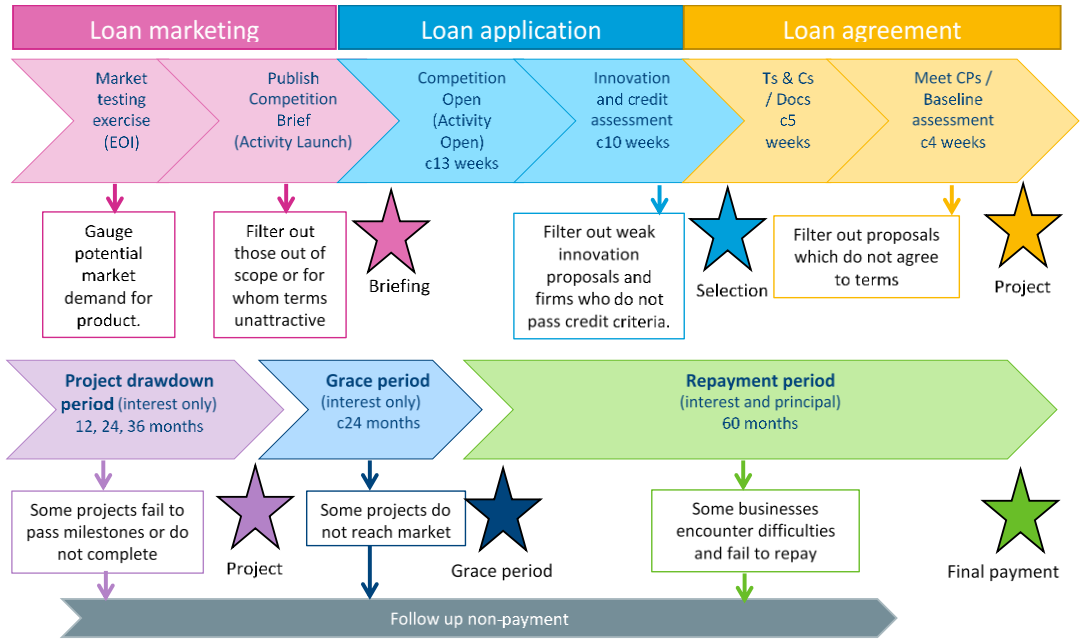
- It is the role of the Lending Operations Manager to work closely with these operational teams and to be the first point of contact regarding the delivery of innovation loans - this includes managing the relationship with the external lending administration partner.
- The Innovation Leads are expected to work closely with the Head of Innovation Lending to develop the competitions in their technical areas and to ensure the relevant Monitoring Officers and Innovation Assessors are used.
- Monitoring Officers are expected to work closely with the Credit Specialists as they will both maintain a close relationship with companies. The monitoring focusses on the following three key areas: financing for the R&D project; progress of the R&D project; and the financial health of the business.
- The Head of Lending Operations & Risk (LOR) oversees the Credit Specialists and Lending Operations Manager – the Head of LOR is a key point of escalation for any problems involving the Innovation Loans processes, policies, governance and credit assessment.
- The Credit Committee is comprised of the Head of LOR, the Head of Innovation Lending and the Chief Investment Officer.
- The successful companies will have direct relationships with the Credit Specialists and Monitoring Officers throughout the project period - Credit Specialists are expected to maintain relationship up to repayment of the loan.

Customer journey

C.5 Figure C-3 summarises the four main stages of the innovation loans customer journey: marketing, application, agreement and repayment. The first part of the loan application stage entails the publication of a competition brief. This filters out firms who are out of scope or that do not find the terms and conditions of the product suitable. Secondly, the duration of each competition (lasting around 10 weeks) raises awareness through various marketing channels (e.g. online, roadshows, intermediary organisations). Following from this, applications are submitted and, based on 'innovation' and 'credit' assessments, some are progressed to detailed credit analysis. The former filters out 'weak' and ineligible innovation proposals using an established innovation scoring approach[66] and the latter filters out firms that do not meet the credit criteria. The assessment process takes c. 12 weeks. Detailed credit analysis involves direct contact with applicants to obtain information necessary for the IUKL credit committee to decide whether or not to make a conditional loan offer. Once the loan offer has been accepted, documentation completed and any loan conditions met, the business starts to draw down loan funds and start their R&D project. The average time taken to complete analysis, documentation and satisfy loan conditions is 4-6 months.

[66] Innovation loans are designed to stimulate high quality innovation projects that would not otherwise have taken place without the loans. This is achieved through the innovation assessment process, where only proposals scoring above a quality threshold (typically scoring over 70%) will be considered for loans. This includes assessment of the need for public money.

Figure C-3: Customer journey of innovation loans



Source: Innovate UK

Innovate UK process

C.6 Further detail on the delivery of the innovation loans programme is summarised in Table C-1. This identifies seven main stages from 'onboarding' (i.e. applications), initial assessment, decision points, post award, monitoring and reporting. These appear to be quite clear and structured. Our review of the programme documentation found evidence of Innovate UK undertaking internal reviews (e.g. Board level six-month review)[67] – to take stock and assess implementation of innovation loans in practice. This involves reviewing each stage and process in the table below, undertaking a self-assessment (i.e. of Innovate UK), consider the suitability of the process, any action required going forward, and timing of when the action ought to be completed.

Table C-1:Innovation loans – Innovate UK process

Stage	Process	Summary description
Onboarding	Application	Application for a loan completed by companies interested in the product
	Part A: Innovation Questions	Innovation questions asked to the applicants which are aligned to the standard Innovate UK application and relate to the proposed project
	Part B: Business Questions	Additional questions focused on the business and its ability to repay the loan
Initial Assessment	Innovation Assessment	5 assessors review Part A to score the level of innovation
	Credit Triage	Credit Specialists review the application to decide whether the

[67] Innovate UK Loans Limited (2018) Board Strategy Away Day - 6 Month Review and Direction Setting. PPT.

Stage	Process	Summary description
		business is suitable for the loan product and further evaluation
Decision Point 1	Credit Triage Approval	Presentation of the credit recommendation on each application to the credit committee and agreeing a credit recommendation
	Line Draw	Summarising which projects have been deemed the most innovative by assessors and ensuring scoring has been completed correctly. Deciding what projects are suitable for progression from an innovation point of view
	Progress Panel	Bringing together the Innovation and Credit recommendations to show which projects should progress to the detailed analysis stage
Detailed Analysis/ Decision Point 2	Customer Engagement	Asking customers questions highlighted in the credit triage stage and holding initial discussions regarding next steps
	Credit Papers	Completing final credit papers based on all the information collected so far and deciding on a final credit recommendation
	Credit Committee	Meetings to discuss each application taken forward from progress panel to decide whether to offer them a loan and what conditions should be included.
Post Award	Management Presentations	Meeting between the applicant and credit committee and the final sign off of the application process
	Legal Execution	Meeting any conditions set out in the loan offer and completion of legal documents
Monitoring	Monitoring Officers	Person assigned to monitor the project with regards to the project baseline plans
	Baseline documents	Documents completed within 60 days of project start to outline the steps involved in the completion of the innovation project
	Credit Specialist	Relationship manager for the business
	Management accounts	Accounts provided quarterly to the credit specialist to ensure the business is meeting financial covenants
Reporting	CRM / Tracking	Tracking progress of projects /businesses to assist and inform portfolio management
	Portfolio Management	Reviewing how the portfolio is performing as a whole and any issues that have arisen.

Source: Innovate UK Loans Limited - Board Strategy Away Day, 6 Months Review and Direction Setting, PPT; SQW

C.7 An important step in the process is the completion of the separate innovation and credit assessments. Table C-2 summarises the topics covered in both these forms.

Table C-2: Innovation and credit assessments

Part A: Innovation Assessment (Project)	Part B: Credit Assessment (Business)
A1: Need or Challenge	B1: Preferred loan conditions
A2: Approach and innovation	B2: Business management team
A3: Project team and resources	B3: Business ownership structure
A4: Market awareness	B4: Business plan
A5: Outcomes and route to market	B5: Business risks
A6: Wider impacts	B6: Private finance
A7: Project management	B7: Business financials
A8: Project risks	
A9: Additionality	
A10: Costs and value for money	
Other funding from public sector sources	
Project finance summary	

Source: Innovate UK

Consultations with those involved in the delivery

C.8 The early review of the delivery process of the programme involved eight consultations with representatives from Innovate UK and other external consultants involved in the delivery and monitoring of the programme (see Annex A). The purpose of these consultations was to gather feedback on the process and 'customer journey', including: marketing, application, agreement, and any monitoring.

C.9 The consultation and documentation evidence indicate that the structures, roles, responsibilities and reporting of the Innovate UK delivery team were generally appropriate and fit-for-purpose. Although this was the case, the various 'actors' in the delivery team would benefit from further clarity about how the teams work together. Currently, this was thought to work because of the individuals in place rather than the strength of the structures. Consultees believed it was a steep learning process for all and that the process was working better with each competition call.

C.10 Overall, there was consensus amongst the consultees that the marketing strategy was improving and becoming clearer over time in reaching its intended audience. The consultations indicated that the first two competition calls of the loans programme provided valuable learning - e.g. non-applicants often did not apply because the application process was perceived to be too onerous. The first two calls of the innovation loans programme were promoted through a variety of marketing channels including via the Innovate UK mailing list, webinars, the Knowledge Transfer Network (KTN) and roadshows across the UK.

C.11 In addition, as an experiment, a Public Relations (PR) agency was hired to raise further publicity in later competitions through a targeted online advertising campaign. The aim was

to reach a range of SMEs that were seeking to scale up and grow their business through investment in R&D. In late 2018, Innovate UK undertook an experiment to use targeted online advertising to increase awareness of innovation loans. Online advertisements, targeted at specific users including founders, CEOs and senior leaders at medium-sized innovative businesses, were displayed on platforms including Linkedin and Facebook. This campaign created 1.7m impressions on Facebook, 229k impressions on LinkedIn and 13.5m display impressions. This generated 18.8k click-throughs to a dedicated micro-site and 2k social media engagements: 110 people signed up to receive additional information. However, since this campaign was run late in the pilot, it did not generate any applications. Nevertheless, Innovate UK considered this experiment to provide useful information on an engagement mechanism that had never been used by the organisation before and that will be considered in other activities.

C.13 The first two competition calls received fewer applications than Innovate UK had originally anticipated. The consultation evidence suggests the following reasons for the low uptake: the roadshow events not being pitched at the right 'level' - they were often aimed at CEOs, which tends to attract smaller (non-scale up) businesses whose CEOs have the time to attend. These reasons imply that the low uptake for the programme was related to the *quality* of the marketing, whereas non-applicant businesses mostly cited internal business reasons for not applying, for example: a lack of internal capacity or skills; unsuitable timing of the call; and a perception that the application process would be too onerous.

> *"The fit of funded projects to the type of funding on offer has been far better for the loans programme than it has historically been for the grants"*

C.14 Consultees indicated that the calibre and appropriateness of the beneficiaries for both calls was considerably higher than other Innovate UK grant competitions. The successful applicants tended to be very well matched to the product: they had higher Technology Readiness Levels (TRLs), albeit still too risky for banks to lend to. A few of the consultees highlighted the fit of the innovation projects with the loan funding on offer – this was considered better aligned compared to Innovate UK's grants.

C.15 The structure was thought to facilitate learning between the Innovation Loans and Innovate UK teams and there are checks in place (e.g. decision matrix) that ensure the credit and innovation perspectives are considered throughout the assessment process. The process was considered to be efficient: the credit and innovation assessments happen in tandem to avoid unnecessary delays.

C.16 The application for the innovation loans programme follows the typical Innovate UK application process quite closely. Applicants complete a two-part application process: part A, focused on the quality of the innovation project, consisted of ten questions, covering market potential, risks etc, and part B, focused on the suitability of the business to take on a long term loan commitment, required historic and forecast financial information. The Innovate UK team found that there were more queries submitted at the application stage than other programmes: applicants often wanted more information on how the innovation loans programme would differ from commercial loans, especially in terms of monitoring and reporting requirements. This was to be expected given the difference between the loans programme and the suite of support mechanisms delivered by Innovate UK.

C.17 We understand that the final stage of application assessment is made using a decision matrix, which allows for a range of projects to be funded, not just those which scored highly in either the credit or innovation assessments. This was thought to provide consistency in the assessment, ensure a level of quality and to diversify the investment portfolio. Our consultations indicated that successful applications scored highly in both assessments.

> *"Whilst we're doing the credit tests, the Innovate UK are doing their innovation assessments. This is an easy way to speed up the assessment process".*

C.18 The loan agreement process is thorough and is a valuable experience for applicants. The discussions highlighted a few areas for improvement - e.g. greater clarity around the respective roles and responsibilities of Credit Specialists and Monitoring Officers - but indicated that the overall structure worked well.

C.19 Once an application had passed the assessment stage, a member of the Credit Team, within Innovate UK Loans Ltd, conducted a site visit to explore any uncertainties with their application and to learn more about the company, team and the project's credibility. These visits provide information for stress tests, financial forecasts and sales pipeline estimations, which inform the team's credit recommendation. They also form a valuable learning process for the businesses: they would not always have an iterative process with a commercial loan application. The Credit Committee use the recommendation to make their final lending decision.

> *"The innovation loans application process will stand projects in good stead for future commercial applications: they wouldn't receive this level of support or tailored feedback from a bank".*

C.20 The Credit Team complete the closing-off process with the third-party lending administration partner and agree the loan documentation with the beneficiaries. This process was slightly delayed by the lending administration partner who was slower to turnaround the documents than anticipated. One consultee suggested that the loan agreement documentation could be tailored to better suit the individual beneficiaries.

C.21 The company beneficiaries are introduced to their Monitoring Officer once the loan has been agreed. They monitor the projects using the standard Innovate UK framework (progress reports, risk assessments etc.). The Credit Specialists continue to monitor the credit standing of the business (quarterly financial information, annual reviews etc.)

C.22 The consultation evidence identified the following areas for improving the delivery of the innovation loans programme:

- **Marketing strategy needs to be delivered to the right level and scale** – some of the activities were not delivered to the right 'level' employee within target businesses. Consultees suggested delivering marketing through Growth Hubs and promoting amongst Innovate UK beneficiaries.
- **Further clarification and guidance on the role of Monitoring Officers** – the monitoring process for loan beneficiaries is shared between the Innovate UK Monitoring Officer and the Innovation Loans Credit Team. In theory, the former monitors the project and the latter monitors the business. However, there are some areas of overlap where the role of the Monitoring Officer needs to be clarified.

- **Scope for beneficiaries to become more familiar with the Monitoring Officers before the project start date** – the credit checks and site visits conducted by the innovation loans team can mean that the Credit Specialists are more familiar with the businesses than the monitoring officers at the time of the first draw down. This could be confusing for beneficiaries who would normally expect to have most contact with their Monitoring Officer.

Feedback from businesses on delivery of the innovation loans

C.23 Some examples of the feedback from businesses on delivery of the innovation loans (business survey and case studies) is presented in Table C-3.

C.24 Innovate UK have sought to take account of feedback as the pilot has developed and has been extended in order to improve the customer journey. Examples of changes reported by the Innovate UK team include:

- The application process in the forthcoming two pilot extension competitions will use a survey-based mechanism to capture business information rather than the upload of a word document to an File Transfer Protocol (FTP) site as in the initial pilot
- A more streamlined business financial template will also be used in the forthcoming two pilot extension competitions
- The template loan agreement was updated once during the pilot to take frequent requests for changes into account. A further full review from a second firm of legal advisors will be undertaken
- Migration of the innovation project part of the application onto the more streamlined and user-friendly Innovation Funding Service (IFS) system will be undertaken for the September 2019 competition
- Interactions with Monitoring Officers and other parts of Innovate UK, including holding workshops and defining the respective roles of Sector teams' Innovation Leads and innovation loans staff, continue to be a focus of attention for continuous improvement.

Table C-3:Feedback from businesses on delivery of the innovation loans (business survey and case studies)

	Comments
Marketing and promotion of the innovation loans	• "Information was pretty well covered. Anyone in contact with Innovate UK would not have been able to miss it". • "The marketing was modest and could have been more high-profile". • "The early workshop events were very good. It took quite a long time to confirm the timings of the programme, which made planning for it quite difficult". • "We felt valued being asked to speak at the launch event and liked the innovation loans presentation consultee attended". • "Not enough information out there". • "The marketing and promotion was excellent, clear and informative".
Communication with Innovate UK throughout	• "Great, very extensive". Consultee thought that this was appropriate given that the application was more rigorous than grant experience. They received three face-to-face site visits before they were formally awarded the funding, these were seen as a good opportunity to show Innovate UK the potential of their project. • Consultee was very impressed by the level and "bespoke" nature of communication from Innovate UK. Consultee preferred communicating with the innovation loans team because the business often had the same point of contact, and had a more personal experience compared to communication on Innovate UK grants - the latter was thought to be less co-ordinated and impersonal. The communication throughout the innovation loans application process was "punctual and informative" – couldn't have been better". • "Much more personal than the automated grants process - always able to speak to someone when needed – could just pick up the phone when had a question". • "Excellent, from start to finish. We met with all of the Innovate UK team who worked very closely with us to understand the project and how it could fit within the innovation loans programme". • "Communication throughout the applications process - face-to-face and the back-and-forth, was critical". • "Very proactive and supportive". • The process was "good" given that the programme was being piloted. The key area that could be improved is the linkages between Innovate UK, innovation loans and the finance sub-contractors. • "There were some key communication breakdowns that delayed the loan".
The application process relative to other finance providers	• "It would be a 5 if the spreadsheet was more user friendly". • "Comparable to a private bank loan". • "The process was broadly similar to the Innovate UK grant funding. The key strength was f-2-f contact (site visit and interview) because it "personalised" the process and facilitated more in-depth discussions about the project: ➢ "we could answer their questions and literally show them how good the project would be"

	Comments
	➢ "the key weakness of the process was that it didn't use the portal used for the grants programme – the portal is much easier to use, and it allows you to track your application". • "More intense and detail-focused than the Innovate UK grants process. Innovation loans is more commercially focused and care about the overall vision for the business, whereas grants ask more about the technical aspects". • "Compared with commercial banks, Innovate UK is more open-minded", recognises the potential value and has a bigger appetite for risk. Banks "would only look at the numbers to assess the likelihood of getting the loan back". • "Innovate UK forms are hugely laborious, very difficult and not user-friendly". Consultee suggests moving on to the new Innovate UK system in future programmes to make it easier to use. Consultee understands that the programme is different from the grants programmes because it has a bigger focus on finances, but reporting on this data "must be made easier". "The process took a lot of time to pull all of the data together – not because the figures were not available, but simply because of the way the system works". More specifically, consultee would like to see: ➢ easier data entry; more structured approach to documentation; and more easily edited data. • "Comparable to full Series A application". • "Much better than the Innovate UK grants process – with grants you are either rejected or not, but cannot meet anyone or ask questions. The loans programme, on the other hand, feels almost as if someone, fortunately, had listened to all of the difficulties in applying for grants from Innovate UK". • "Very time consuming – this is fine if successful, but otherwise a lot of wasted time. Do not expect Innovate UK to guarantee applicants that they will be successful, but would have liked to see some progress reassurances". • "Relative to other public sector provision, the innovation loans process was by far the simplest and easiest to complete. The form itself is onerous but it is clear what is expected in each section". Consultee particularly liked the excel templates. • "Suggest using a different, simpler application for smaller amounts (e.g. £200k vs £1m)". • "The procedure of marking the project out of 5 against categories doesn't neatly translate from grants to loans: a late-stage R&D project with an innovation loan is more likely to score 1/5 on the risk register because it is more dependent on external influences…when we had a grant we were easily scoring 4 or 5 on every category". • "The application progress took a lot longer than expected so people should be told to be prepared for how long it would take". • "The application was paper-based and didn't utilise the portal, like the Grants programme - prefer to use the portal as it allows to track application…just so much easier". • "The application spreadsheet is not user friendly and the level of monitoring is too high for a loan. The application process is burdensome for previous Innovate UK beneficiaries – there could be less onerous application procedures for previously 'vetted' businesses". • "The application needs to be tailored to suit loans. It's clear that Innovate UK are using grants documentation".

	Comments
	• "The level of detail required in the application was 'excessive' compared to all other finance applications. It was so onerous that there were points where we considered not continuing with our application". • "The process works well if applicants are aware with the grant system". • "Frustrated by some of the systems as it seemed as though they were just using grants documentation rather than tailoring to loans. This makes the application process more difficult. This impacted on the usefulness of the monitoring processes i.e. the loan is given upfront so having progress updates felt nonsensical". • "The application process could be streamlined to reduce the pressure on applicants - the two parts felt like two separate submissions. Otherwise very positive experience".
Time between application and decision (and time between decision and drawdown)	• "Good but would have preferred it to be quicker". • "Time between application and decision was broadly in line with expectations but still longer than any business would ideally like". • "Much quicker than what we're used to. Delivered on promised timings". • "The application process felt quite slow". • "Unclear how long the process would take, but also did not take very long". • "It took 4-6 weeks for Innovate UK to "finesse" the offer. Consultee was fairly confident they would be successful and that this was more of a discussion between the two organisations (business and Innovate UK). Consultee was sure the decision-making process will have been refined as the programme developed. • "If I could give a 6 or a 7, I would (scoring out of 5). To apply for something and actually get your first drawdown months later is phenomenal speed – that doesn't usually happen". • "Quick". • "Very quick". • "The application process was very good: funding decision was made promptly and our prior experience of Innovate UK applications meant we were well prepared to submit a strong application". • "Advertised time between decision and drawdown was shorter than actual (5 months instead of 3) but quick turnaround was one of the attractions". • "The time taken to make the decision and then to release the finance was too long. We took a risk and started the work before having the funding to avoid losing momentum". • "There was a delay in receiving the loan, which impacted on delivery. The systems for releasing the funds need to be better coordinated in future".
Ongoing support and advice since the innovation loan awarded	• "Good". • "Fantastic – no suggested improvements".

	Comments
	• "Innovate UK were very commercial in their approach". • Innovate UK visited the business' factory soon after being awarded funding. This provided an opportunity to raise their profile and to show Innovate UK their business. Consultee also attended portfolio events and are looking forward to attending an event in March 2019 with the innovation loans beneficiary pool. Consultee was very eager to access the "additional" benefits of Innovate UK-engagement i.e. network links and potential collaborations. • "It is still early days so difficult to judge - one meeting so far with Project Monitoring Officer who was very supportive". • "This hasn't gone quite so well" – there are some differences between the grants and loan programme that are not reflected in the processes/support. • "Have been invited to take part in accelerators and other support activities but felt that these were more suitable for early-stage companies so have not participated. Overall, there is a healthy amount of support and advice – it is there if needed but not excessive". • "Very supportive and proactive, no gaps". • "This was the weakest area of delivery. The monitoring procedures were far onerous for a loans programme. There was some frustration that the monitoring requirements were the same as the grants programme and argued that bespoke material should be developed – "we're more than happy to host Innovate UK and show them what we're doing, but the level of admin they're expecting at the moment is untenable". • "The quarterly reporting for the Innovate UK monitoring officer costs approximately £600, plus staff time, per quarter. This process could be simplified in future". • "The reporting structure was weak - the loans and grants documentation are identical. The documentation didn't reflect the later stage of R&D". • "There was some confusion around monitoring forms - quite a lot of duplication, not quite sure which forms were the right ones, etc.". • "Would like to see the programme more joined up - the separate monitoring process for business performance and project performance mean that there is no one point of contact for beneficiaries. This has made the process more confusing than it should/could have been. The two organisations (Innovate UK and Innovation Loans) should co-ordinate one point of contact for businesses".

Source: SQW case study interviews

Annex D: Assumptions for estimating impact

D.1 The assumptions used to estimate **deadweight** for each survey respondent are set out below.

Table D-1: Deadweight assumptions

Response	Factor applied to gross impact estimates
The change would have happened anyway, at the same speed and scale - the loan made no difference	Use 0% of impact
The change would have happened anyway, but the loan made it happen faster	Use 25% for each year the project is brought forward, i.e. 1 year quicker = 25% additionality, 2 years = 50% additionality, 3 years = 75% additionality, 4+ years = 100% additionality
Some of the change would have happened anyway, but the loan increased the scale	Follow up question gives range for the proportions, and we will use the mid-point based on the response
The change probably would not have happened without the loan	Assume 75% is additional
The change would definitely not have happened without the loan	Assume 100% is additional
Don't know / Refused	Assume 50% ("don't know" or "refused" could genuinely reflect not knowing or able to answer the question, so additionality could be high or low in these cases)
Both speed and scale additionality	Additionality = 1 minus multiplication of individual deadweight proportions. E.g. if 1 year faster and 50% smaller, additionality = 1 – 75%*50% = 37.5%

Source: SQW

Annex E: Case studies

Table E-1: Case studies

Business	Competition
3-Sci	First
Ashwoods Lightfoot	First
CitiLogik	First
G-Volution	First
Ashwoods Electric Motors	Second
Callaly	Second
Advanced Electric Machines	Second
KwickScreen	Second
Valuechain	Third
Parcel Vision	Third

Innovation loans – 3Sci case study

3-Sci is an Internet of Things (IoT) company that specialises in sensor communication systems for the energy sector. It spun out from an oil and gas company in 2013 and is based at Lee-on-the-Solent, near Fareham, Portsmouth. 3-Sci developed 'CUItest', a technology that can identify corrosion problems that are difficult to detect with existing, commercially-available systems. Energy and processing plants are often densely-filled with machinery and pipework, making it difficult to use equipment to quickly detect and quantify corrosion problems with for example, X-ray, Eddy current or thermal imaging techniques, or even the naked eye. CUItest offers a solution for fastest evaluation. CUItest sends radio waves into closed spaces (thermal insulation surrounding pipework) to indicate the conditions that may create corrosion. CUItest's underpinning technology was developed in a feasibility study funded by Innovate UK's Energy Game Changer Competition from 2015. 3-Sci sought funding to progress the technology to TRL 7: design, manufacture and install prototypes of its CUItest hardware and software systems into operational environments. 3-Sci was awarded a £308k loan in May 2018.

At the time of consultation, 3-Sci had completed its first CUItest prototype and was preparing to install onsite at a prospective customers' premises – expected to install the first prototype in an operational environment in September/October 2019. The installation will provide an important contribution to the CUItest case history, which is "*essential for attracting customers"* who are often hesitant to trial a technology without a proven track record. In the future 3-Sci expects to increase its investment in R&D, secure IP for the underpinning technologies, increase exports and employment. In the absence of the loan it would have taken 3-Sci at least two years longer to build a case history for CUItest – under which circumstances, the opportunity could have been lost. The loan is seen as an important contributory factor to success for this product and the 3-Sci business, alongside the firm's commitment to progressing this project and meet its aims of export-driven growth with this product and several others it is bringing to market in 'asset integrity'.

3-Sci applied to innovation loans because the project was too costly for it to fund internally in the available timeframe. The company had previously explored equity investment (VC and Angel), and was successful in receiving an equity offer from a VC fund. However, 3-Sci declined this equity investment for a number of reasons, not least that the terms and conditions associated with the investment were unfavourable - which included, in the eyes of 3-Sci founders, an imbalance of the VC-desired share rights (e.g. preferential shares) for the commitment offered. **The innovation loan is seen by 3-Sci to provide a valuable finance alternative for SMEs looking to grow**. It was favoured over private lending because the low interest rate and flexible repayment period gave 3-Sci confidence that it could deliver the project at its a pace which was more controllable, allowing leeway for unforeseen obstacles typical of technical developments and product roll-outs and importantly, the 3-Sci founders will not find that their ownership and control of the Company is potentially undermined if for e.g., investors wish to assert their rights in a manner which is not in the long-term interests of the Company.

3-Sci founders are very positive about the Innovation Loans programme. The application process worked well, the funding decision was made promptly and in the view of the 3-Sci management team *"was exactly the support we needed at the time"*. However, a suggested area of improvement relates to the technical and financial quarterly monitoring and reporting requirements of the programme – ideally, these could be more tailored and less time consuming and/or demand less detail. For example, the quarterly financial reporting, independently audited through the Company's accountants, has amounted to many thousands of pounds of additional direct expenditure and man-power, for which the 3-Sci team did not make full provision in their initial plans for this project.

Innovation Loans – Ashwoods Lightfoot Case Study

Ashwoods Lightfoot is a clean technology company specialising in Internet of Things connected car technology that enables drivers to integrate cars into their connected lives. It was established in 2012 as a spin-out from Ashwoods Electric Motors to solve the problem of bad drivers reducing the impact of the company's efficient drive systems for hybrid and electric vehicles. Using real-time engine data, Lightfoot's technology gives drivers the opportunity to monetise their good driving. After successfully establishing itself within the fleet sector, the company decided to explore the possibility of expanding into the consumer market. This move would enable Lightfoot to connect much larger volumes of vehicles and integrate these into Smart City infrastructures. In April 2018, Lightfoot received a **£1m innovation loan** to make the product more consumer-focused and test its usability.

Prior to receiving the innovation loan, the company's R&D activities were funded by a mixture of internal funds and public sector grants. As an early-stage business, Lightfoot was unable to apply for a commercial loan. Without an established track record, the company would also not have received a good valuation for equity investment. The business, therefore, would not have been able to obtain similar finance from elsewhere. With a greater appetite for risk, **the innovation loan *"provided a solution that no one else could."***

The loan enabled the company to invest in R&D that they otherwise could not have. The two central outcomes of the product relate to **introducing a new product** and progressing it towards **commercialisation**. It is expected that sales will grow by 80% and 60% in the two years from launching the product. As a direct result of the loan, the company has **increased its employment** by 20 FTEs (with a further 50-60 expected in the next three years). Since receiving the loan, Lightfoot has **secured a further £2.5 in equity investment** from the Business Growth Fund (BGF). The innovation loan contributed to raising this funding from BGF by adding credibility to the business: "*The Innovate UK funding and stamp of approval definitely made that deal happen more easily.*"

With the company's revenue in 2018 slightly below target, the loan gave them *"the headroom to carry on investing in the future."* Without it, the outcomes would have occurred but at a much slower rate (at least four years), on a smaller scale (and opening up the consumer market would have been less likely), and of a poorer quality. Without the loan, the firm would have missed the window of opportunity to be the world's first. The firm considered that the **innovation loan was critical to unlocking the benefits that were reported**.

The business rated all aspects of programme delivery very highly: *"It has been clear, concise and easy to manage."* Particular strengths related to the **terms and conditions** (specifically low interest rates, flexible payback period and high appetite for risk), the **application process** relative to other finance providers (more open-minded and recognising the *potential* value), the **time between application and decision** (much quicker than the business was used to), and **communication** with Innovate UK throughout. The business has received valuable **support and advice** since the loan was awarded, for instance when a new investor required various documentation and approvals from Innovate UK. This was turned around very quickly by the innovation loans team. Overall, it was recognised that the programme *"felt more like an investor than a debt approach."*

Innovation Loans – Citi Logik Case Study

Citi Logik is a network analytics SME that specialises in deep data mining and artificial intelligence-led research. It was awarded a £1m innovation loan. It uses mobile network data to predict demand more efficiently than existing approaches within the intelligent mobility, smarter cities and built environment market. Its main aim is to understand movement by vehicle, on foot and public transport using mobile network data to better gain deeper insights into how people live and move. Founded in 2011, Citi Logik has eleven employees and annual turnover of £1M+. It has recently relocated to Leeds from the Future Cities Catapult in London.

In March 2018 Citi Logik tried to raise Series A funding but were unsuccessful. Investors did not want to invest in a standalone product but expressed interest in a fully integrated platform. Citi Logik applied to innovation loans soon after and was awarded in May 2018. Over three years, the funded project aims to scale up its 3/4/5G data analytics services into an integrated offer, Citi Analytics. It would be the first real-time data analytics engine with a reporting function accessible to individuals living in urban areas. The consultee described the project as moving the product from "Microsoft Excel, Word and PowerPoint to Microsoft Office". The project would move the integrated offer to TRL 9, giving Citi Logik a competitive edge in the global market and will help to unlock series A investment.

The company's involvement in innovation loans has given it greater confidence to raise funding from the private sector. The loans programme, more so than a grant, acts as an endorsement of the company, its maturity and the Citi Analytics product. Since accessing the loan, Citi Logik attended a Northern Powerhouse VC presentation and raised £1.1M from Northern Powerhouse Investment Fund and others. The consultee attributed this to the programme – *"the innovation loan made us compelling"*.

In January 2019, Citi Logik had successfully progressed the four project lines across its business and customer base (e.g. analytics for a customer in the rail industry) closer towards commercialisation but expected to experience most of the benefits in the future. Six months later, the project lines had progressed even further, employment had grown (2 R&D jobs and 1 in sales and marketing) and it had begun to explore other possible applications for the technology (e.g. in measuring pollution). Without the funding, it would have likely taken Citi Logik between six months and one year longer to secure finance to develop Citi Analytics and experience the associated benefits. The consultee emphasised that in this time it is possible that it would have missed out on valuable market opportunities.

Overall the programme was seen to fill an "*essential"* gap in business support. It gave Citi Logik a 'lifeline' to develop its technical capabilities and explore new markets that could not be provided by the private sector. The most attractive feature of the loan was the flexible payment. Citi Logik chose to distribute the loan across twelve, equal quarterly payments, which allowed it to plan a linear development path over the next three years. In contrast, the application form and monitoring were seen as areas for improvement, (Citi Logik was the first to go through this process). Firstly, the reporting spreadsheet was not user-friendly and was repetitive for existing Innovate UK beneficiaries. Secondly, the monitoring and reporting detail was more than would be expected and made the funding feel more like a grant than a loan. A strong plus has been the excellent support from the Innovate loans finance team. This has been a significant part of making the overall process a success for Citi Logik. The consultee proposed that businesses with a proven track record with Innovate UK could undergo a streamlined application and monitoring process.

Innovation Loans – G-Volution Case Study

G-Volution is a developer of advanced low-carbon multi-fuel technologies for heavy duty diesel engines in the automotive, rail, off-road, static power generation (gensets) and marine sectors. Their innovations aim to reduce carbon emissions and costs. In recent years, G-Volution moved its focus to engines for trains. Its business partner, a US company that sells in the US rail sector, identified a new Original Equipment Manufacturer (OEM) customer, Cummins. Cummins were looking for a cost-effective, greener engine to roll out across rail, marine and genset sectors. It secured a £1m innovation loan to support a project that aimed to create a demonstrator engine for Cummins. The engine would be the first commercial natural gas dual demonstrator for the genset market.

G-Volution had extensive experience in R&D in both engine (TRL 4-8) and catalyst (TRL 2-5) research. Previous R&D had been funded through a mix of public and private sources (e.g. Finance Wales, the former Department for Trade and Industry, and angel investment). The company needed an innovation loan because the risk associated with developing the demonstrator was too high for them to deliver independently. It was deemed to be too risky by an angel investor who rejected G-Volution's application: the route to market was not sufficiently developed and the Return on Investment (RoI) was unclear. Innovation loans was preferred over other public-sector grants because it offered greater flexibility. G-Volution were able to partner with international organisations and target the overseas market.

In 2018, G-Volution also secured a contract with the rail sector worth £750k. Together with the innovation loan, this sufficiently de-risked the project to attract £650k equity investment. The consultee reported that the innovation loan provided a third-party endorsement of the natural gas dual engine and the rail contract demonstrated demand for another area of the business. The private sector contract would have been enough of an endorsement but it is likely that G-Volution would have had to provide a more detailed business case, or financial history - "the combination of the loan and the contract meant the investment process went smoothly, with just one it would have taken more work".

Project progress between January and July 2019 was limited. The original workplan assumed that G-Volution could buy a pre-identified engine with the specific modifications required for developing the demonstrator. They were then unable to purchase the engine and had to source a suitable alternative. This took them far longer than anticipated and the project is 7-8 months behind schedule. In July 2019, G-Volution had acquired an engine in the UK and had installed it at their test cell station. It will be able to progress the project as expected from Autumn 2019.

Overall, G-Volution spoke positively about its experience of innovation loans. The company commended the supportive, knowledgeable and helpful staff at innovation loans. In the absence of innovation loans, G-Volution would have found it challenging and time consuming to secure the same level of finance accessed and the additional external investment, possible delaying the project by six months to one year Looking forward, G-Volution recommended that the programme improve communication among its internal departments and subcontractors to ensure the programme runs smoothly and is coordinated. G-Volution suggested Innovate UK refine the application process to allow for better communication and coordination with regards to the reporting mechanisms required once the loan has been granted. The consultee had the sense that Innovate UK had not fully coordinated the aspects of financial reporting and the role of a monitoring officer in this instance.

Innovation Loans – Ashwoods Electric Motors

Ashwoods Electric Motors is a Tier 1 electric motor manufacturer in the off-highway sector. It was awarded a £1m innovation loan. Originally Ashwoods developed its electric motor technology for Automotive Market, latterly Ashwoods refocused on delivering automotive technology to Off-Highway markets. The core technology it had developed for high-end vehicles easily transferred into parts of the new sector: The driver for the Innovate Loan funded project AIMs was a new set of regulations encouraging manufacturers of small scissor lifts to move from Hydraulic drives to electric drives. This regulation change generated a new demand for an ultra-low cost electric motor.

Ashwoods developed early prototypes for a select few Vehicle Original Equipment Manufacturers (OEMs) that established a key customer base. However, to keep the cost of production low, and in the UK, it needed to develop a highly automated method of producing the motor on site at Ashwoods Technical Centre in the South West of the UK. This formed the basis of the Innovation Loans project, which sought to develop a 'ultra-low cost', low power electric motor to address market demand. The project TRL is low (TRL 3) but it will be used to accelerate a higher-TRL product to market. The technology underpinning the motor was developed through a series of Innovate UK-funded projects since 2009, and external equity finance. The company has two strategic investors, Dana (transmissions manufacturer) and Curtis Instruments (Motor Controller Manufacturer) who are two of the largest Tier 1 suppliers in the electric drives sector.

It applied to innovation loans following a recommendation from its sister company, Ashwoods Lightfoot. Innovation loans was preferred to grant funding because the finance was available up front and was quicker to access than grants. It was preferred to private sector finance because the business had existing investors who were not willing to dilute their company shares. The loans programme was seen to occupy a unique place in the funding landscape that filled the gap between early TRL public funding and later-TRL private finance.

In February 2019, Ashwoods Electric Motors had employed two new employees directly related to AIMs, who brought key new skills and expertise to develop the manufacturing system specification. By July 2019 it had employed an intern and the project had moved into its design phase and had recruited new PLC resource. The project had enabled Ashwoods Electric Motors to pivot its business focus from engineering to R&D: where several members of staff previously worked across both areas, six are now wholly focussed on R&D. In the absence of the loan, it would not have been forced to manufacture the ultra-low cost motor overseas or stop development altogether and focused purely on its existing motor products. It expected other benefits by the end of 2020 including, a more efficient (cost and time) manufacturing process, and associated IP; and developed a new product to the business and market. Ashwoods Electric Motors is likely to unlock substantial sales as a result of the loan, with confirmed SOP dates for multiple thousands of motors in 2020 for the ultra-low cost electric motor.

In summary, Ashwoods Electric Motors considered the loan programme a success. The 'commercial' approach to delivery was seen to be a positive step that might help to challenge a grant-dependent culture amongst R&D firms. A key area of strength for the programme was the timeliness and flexibility of disbursement: the project started promptly and Ashwoods Electric Motors could negotiate a payment schedule that aligned with their activity. The consultee proposed that the application process make better use of the online portal used by Innovate UK grants programmes. The portal allows businesses to easily track the progress of their application.

Innovation Loans – Callaly Case Study

Established in 2015, Callaly seeks to disrupt the feminine care market. The company's key innovation is the Tampliner – a novel combination of an organic cotton tampon with the added protection of a mini-liner. Despite considerable customer demand following the product's soft launch, its supply was constrained by the semi-manual manufacturing process. In 2018, Callaly received a **£1m innovation loan** from Innovate UK to scale up production by developing a highly automated, high-speed production line. The programme felt like a good fit for the business, enabling it to overcome R&D challenges at the right pace and without compromises in quality. Without the loan, Callaly **would not have been able to attract similar finance from elsewhere**. They had been discouraged from applying for a commercial loan: private sector providers would have been unlikely to accept the risk associated with an early-stage, pre-revenue company developing innovative machinery. An alternative source of funding would have been equity investment through a venture capital (VC) fund. However, VC investors would likely have expected the project to be accelerated. For a business developing a feminine care product, rushing the development of manufacturing process could have serious health and safety implications.

Three months before the expected completion in September 2019, the project was on track against all milestones. There were a number of benefits associated with the project, including **new patents** expected for the machinery. As a direct result of the loan, **five new employees** had been recruited (with three more expected by end of 2019; and a further 10 in 2020). The production line was expected to **introduce more efficient processes**, cutting production time by almost 90% (increasing output from 3,000 per week to over 10,000 per day) and delivering 'Overall Equipment Effectiveness' – a measure of manufacturing productivity – of 85% (compared to 40-50%). By enabling to scale up production, the project was expected to **enhance commercial readiness** (with a **forecast 50x increase in revenue** within two years post-completion) as well as enable **expansion into foreign markets**. The project had given Callaly the confidence to develop new products, expected to lead to **£2.5m additional investment in R&D** over the next three years. The loan helped the business **access private finance**, attracting over £3m of further investment from Angels and other non-institutional investors. This ability to leverage further investment was attributed entirely to the loan through **added *"prestige and credibility"*** – particularly important to an early-stage company.

There is high additionality for the case study. Without the innovation loan, the benefits associated with the project would have occurred at a slower rate (resulting in a risk of not delivering the machines on time and in full), smaller scale (further developing existing manual stations instead of a full production line) and reduced quality. Development and production activities would probably have been moved overseas, slowing down progress. The project was aided by Callaly's own commitment to progressing it, and the firm's expertise in marketing activities. Relative to these, the loan was the **critical contributory factor** in unlocking the benefits: *"It's like playing in the Premier League because of the backing from Innovate UK – without it we would have been in the lower tiers of the Championship League."*

Overall, the business had a positive experience with innovation loans. Key strengths of the programme related to the **application process** (particularly the face-to-face and back-and-forth style of communication), **timeliness of funding** (three months from application to first drawdown), **communication** (including marketing and promotion activities), and the **support and advice** from Innovate UK. It was felt that the team at Innovate UK was keen to help the business grow and succeed: *"One thing you cannot put a price on is the innovation loans team's big sincerity to help us achieve our goals."*

Innovation Loans – Advanced Electric Machines Case Study

Advanced Electric Machines (AEM) was established in 2017 as a spin-out from Newcastle University. It has developed the High-Density Switched Reluctance Machine (HDSRM), a magnet-free alternative to conventional traction motors. This innovative technology achieves the performance of permanent magnet motors at a lower cost and reduced supply risk, and presents a more sustainable solution for industry. In November 2018, AEM received a **£956k innovation loan** to improve its small-scale and labour-intensive pre-production manufacturing capability. The new production line was intended to integrate two unique processes allowing a scaling up of manufacturing cost-effectively. As a very early stage company with only a year's credit history, **the innovation loan was required to offset the risk associated with the R&D**. The business would have had to wait for another year or two to apply for a commercial loan.

The key outcome of the project was the introduction of **more efficient processes**, expected to increase production capacity from 3,000 to 12,000 motors per year. The company is planning to integrate three new technologies within the production line, allowing for at least two other types of motors to be produced. They also plan to **increase employment** by around 19 employees by Q3 of 2020 with a further 12 over the following two years. AEM has licensed two sets of IP from a sister company, and expects to apply for additional patents underpinning the production line. The new facility has **helped move the project towards commercial readiness** and is **expected to lead to increased exports**.

The loan **helped the business leverage further funding**. AEM was originally planning to submit one application for a £300k IDP 15 grant from Innovate UK to support a related project. Given the increased scope enabled by the loan, they were able to apply for five more IDP15 grants for other related projects, and received four of these totalling £2.9m (£4.3m internal funding). They are also in the process of closing an investment round to accelerate development. The innovation loan has **enhanced AEM's capacity to access private finance** by allowing the firm time to create a strategy, and providing the credibility needed to secure funding. The backing from Innovate UK has also helped to develop a strong relationship with Sunderland County Council.

Without the loan, AEM would probably have developed the production line for a single customer. The output without the loan (including the timing, scope and quality of it) would therefore have depended on the customer. In addition to the loan, two other factors contributed to achieving the benefits: wider market developments towards electrification, and the firm's involvement in an Industrial Strategy Challenge Fund (ISCF) programme which has helped expand its customer base. Relative to these, the **innovation loan was considered to be a critical contributory factor** (the firm attributed 80% of the reported benefits to it).

Overall, AEM has had a positive experience with the programme. Key strengths related to **marketing and promotion**, **communications** with Innovate UK, and ***"support beyond just lending the money."*** For example, the innovation loans team helped the business explore different fundraising routes, which made them more confident in approaching VC investors in the first funding round. Although the loan was timely, planning for it was difficult because the timings were not clearly communicated. The company would also like to see improvements in the application process (easier data entry and editing) and an increase in the loan amount (£5-10m). It was suggested that the programme could benefit from better integration with other public funding programmes. For instance, closer collaboration between the loans and grant funding teams would help to identify the most appropriate companies for loans helping accelerate the industrialisation and return on investment on the technologies developed.

Innovation Loans – KwickScreen Case Study

KwickScreen is an innovative space management solution business. Established in 2009, it has 16 employees and generated £1.2m turnover in the UK in 2018. In the three years prior to applying to innovation loans, it had some involvement in later stage R&D but had no experience of securing external finance (public or private) for R&D. **It received a £300k innovation loan in November 2018.**

Its main product, KwickScreen, was first conceived as a flexible alternative to curtained partitions in medical settings. It has since developed to provide additional benefits. The screens can be easily cleaned, facilitating high hygiene standards; and can be customised with calming pictures/patterns, to deliver health benefits to patients facilitating their recovery. Following its success in hospitals, it started to sell KwickScreens into health-adjacent sectors (e.g. physios, GP clinics, medical simulation training centres and first aid areas) and is planning on now growing sales in non-health markets (e.g. schools and universities, gyms and offices). The aim of the innovation loan-funded project was to improve the efficiency of the manufacturing process of the composite bi-stable tubes that are the costliest and most innovative part of the production process, making future KwickScreen products more affordable and therefore being more attractive to the non-health sectors in particular who are more price sensitive.

The innovation loan was needed to offset the risk associated with the R&D. It enabled KwickScreen to broaden the scope of its research to include higher-risk, more experimental testing. The funding was used to cover material and personnel costs. The firm had successfully applied to Funding Circle, a peer-to-peer lending platform, but declined the funding because the repayment period would have put pressure on the business's finances and would have inhibited its ability to conduct further R&D in the future. **The loan was described as filling a gap in finance provision.**

Overall, the business was satisfied with the programme's customer journey. They were particularly impressed with the quality of ongoing support and advice after the loan was awarded. For example, the Head of the programme visited KwickScreen's factory and the project lead from KwickScreen attended useful portfolio and networking events. The business highlighted two areas for improvement: the time between the application and funding decision had been longer than anticipated, and the marketing and promotion of the programme could have been more high profile.

The funding enabled KwickScreen to place more focus on its R&D than it had previously. They have hired one new employee in R&D and promoted several existing employees to more senior, technical roles. In the future, the business anticipates additional economic growth: eight FTEs by 2020 and a further two by 2021. On project completion, the composite tubes manufacturing process will be cheaper and quicker and higher in quality.

In the absence of the funding, the scope of the project would have been narrower, and the scale of the impacts would have been smaller. The loan was considered to be an important contributory factor in achieving the benefits alongside the firm's internal commitment to the project and knowledge gained at external conferences. The consultee summarised KwickScreen's experience as follows, *"The loan has given us the space that we needed to sow the seeds for our future growth. It has allowed us to work on the things that are best for the company in the long-term, not just what is needed in the short-term."*

Innovation Loans – Valuechain Case Study

Established in 2011, Valuechain is a software company specialising in digitalisation of manufacturing processes and supply chains. The business provides enterprise resource planning (ERP), productivity and collaboration software for advanced manufacturing. There is a big market opportunity for this technology in aerospace: additive manufacturing (AM) is rapidly disrupting the sector, while ERP systems have failed to keep up with specialised demands. In October 2018, Valuechain **received a £962k innovation loan** to develop and pilot a production control software system to streamline, standardise and digitise processes for AM. Applicable to companies of all sizes, the software is expected to drive adoption of AM in the UK and enhance the competitiveness of the country's aerospace sector.

The Innovation loan was needed to offset the risk associated with R&D – the project was considered too early-stage for a commercial loan**.** At the time of applying for the innovation loan, Valuechain also received two offers from VC funds. These were turned down in favour of the loan because its terms and conditions were better – the loan was more flexible and less expensive overall (interest rates compared with fees and equity stakes). The funding from Innovate UK was also considered to add credibility to the business – *"it is not easy money to get."* The loan enabled the company to invest in R&D it otherwise would not have. By **developing an innovative product** that is new to the market, Valuechain is using the loan to secure first mover advantage globally. So far, the business has added new features and functionality to the software, and conducted market research to better understand the market opportunity. As a direct result of the loan, Valuechain has recruited an **additional three employees** specifically for the project (two in R&D, one in marketing/sales).

The introduction of more efficient and agile development processes internally was expected to lead to cost and time savings, as well as an improvement in quality. The loan has **enhanced Valuechain's ability to innovate** by relieving financial pressures and enabling it to be more strategic: *"'We are able to think about what we could be doing, not what we have to do."* The firm also considered the investment from Innovate UK to have raised credibility and **enhanced its capacity to access private finance** in the future. It was anticipated that another £1m would be required over the next three years for commercialisation.

Without the loan, the benefits relating to the project would have occurred at a **slower rate and been on a smaller scale**. A delay would have reduced the company's ability to secure competitive advantage – which would have impacted significantly on the prospects for commercialisation and sales. The progress of the project has been helped by wider market developments and favourable conditions, but relative to these, the firm considered that **the innovation loan had been an important contributory factor in achieving progress**.

Overall, the firm considered the loans programme to be *"really well thought through."* Its strengths related to the **timeliness of funding**, the **communication with Innovate UK** throughout the application process, and the **ongoing support and advice** since the award. Two key areas of improvement were identified: marketing and promotion of the programme (*"more people need to know about it"*), and the application process (demanding and time consuming). Valuechain spent four weeks preparing the application, which they considered to be a combination of *"a typical grants application and a business plan for VC."* They would have liked more reassurances along the way to make sure that they were on the right track.

Innovation Loans – Parcel Vision Case Study

Since 2016 ParcelVision has project to develop a new cloud-based logistics solution helps retailers and e-commerce providers manage and optimise their logistics. ParcelVision interfaces with all the major couriers (including DHL, UPS, FedEx, DPD and many others) and enables retailers to optimise the choice of courier, provide more delivery choice to their customers at checkout, produce shipping labels and proactively notify customers of delivery issues, empowering them to self-serve to resolve delivery issues. Additionally, ParcelVision's disruptive technology enables retailers to circumvent traditional routes to market such as appointing international distributor or using couriers like FedEx to export, and in so doing so, reduce delivery costs by up to 80%. ParcelVision was awarded £611k from innovation loans in November 2018.

Since 2016 ParcelVision had funded development of its technology up to TRL 6 through public sector programmes, such as Innovate UK's Smart Grants, and retained profits from its sister company, ParcelHero Group. The innovation loan is being used to push the ParcelVision technology from TRL6 to commercialisation. Parcel Vision also had access to the ParcelHero infrastructure, equipment and facilities, which had accelerated their development by reducing their costs of R&D. However, it became clear in early 2018 that ParcelHero could no longer afford to front all the costs of ParcelVision.

ParcelVision considered a range of alternative sources of finance and submitted application for a commercial loan and VC funding. It was rejected from both sources because of insufficient business history: neither provider was able to calculate the risk of investing because the business was still pre-revenue and the market was very new. The programme offer was considered to be unique to the landscape of provision: it took on projects with higher risk and offered more funding than other public provision.

At the time of consultation, January 2019, the programme was running slightly behind schedule. It had encountered some technological difficulties with the software, but the consultee was confident that the lessons learned would be essential to the software's success. The most important element of the project was that the technology was scalable and reliable in order to cope with very large throughput (A typical target customer ships 100k orders per day). Therefore, the technology had to be tested for resilience, and the architecture tweaked to ensure the technology was scalable enough to support large spikes in demand. This extensive testing and adjustment in architecture led to some delays, but *"the delays were worth it to ensure [ParcelVision] was fit for purpose."*

Within the first two months of receiving the loan, ParcelVision had enhanced its innovation capacities and skills. It has established a Centre of Excellence that trains staff in the latest technology and methodologies. This was established because the pool of skilled staff who have worked in these cutting-edge technologies is limited, because they are so new. The innovations loan funding has developed staffs' skills/competencies by providing the financial resource for staff to innovate, learn and test the technology. They have a more skilled workforce as a result.

Without the loan, it would have taken six to 12 months to develop its internal innovation capacities. This would have meant they could have lost their competitive advantage – "*by that time we may have lost our technological lead, and an exceptional opportunity to leverage our innovations to take market share."*