

# **Manufacturing Connect**

**Business Basics 3  
Innovate UK**

## **Final Evaluation Report**

Lawrence Green  
Qi Cao  
Sabaa Jahangir

MMU Evaluation Team

March 2022

## Executive Summary

We report on the independent evaluation of the Manufacturing Connect Lancashire (MC\_L) project, a Randomised Controlled Trial (RCT) undertaken as a part of the BEIS and Innovate UK supported Business Basics 3 programme.

MC\_L required the development and delivery of a multi-stage 'awareness, knowledge and confidence-building' intervention designed to encourage and support SMEs in the North West of England on the journey towards adoption of productivity-enhancing digital technologies.

The project consortium included Edge Hill University (EHU) and the Advanced Manufacturing Research Centre at University of Sheffield (AMRC) as lead management and delivery partners, and Manchester Metropolitan University (MMU) as independent evaluator. Blue Wren, Progress Plus and Synergy Technology were involved in delivery of the intervention as vendor experts, as were Inscape Interiors and Panaz as experienced technology adopter/users.

MC\_L was designed around four key aims: (1) to encourage and increase 'intention to adopt' digital technologies among NW SMEs; (2) to improve awareness, knowledge and confidence re: adoption; (3) to support informed planning and reduce timescales for adoption; and (4) to optimise retention of participants across the programme stages. The aims were encapsulated in the research questions that underpin the project.

As an RCT, the project involved random allocation of participants to a Treatment (T) and a Control (C) group. The former experienced delivery of intervention content in 'live' online workshop settings with a peer-to-peer (P2P) element provided by the expert vendors and users. The latter experienced delivery of identical content, though in a self-directed, asynchronous consumption format and without a P2P component. The project hypothesis was that inclusion of a P2P element in the intervention would deliver benefits to the T group (in relation to the aims above) over and above those experienced by C counterparts.

The evaluation was designed to (a) gather and analyse performance data with respect to the aims and hypothesis, and (b) investigate process and implementation issues in connection with the project (in particular those relating to registration, recruitment and retention/progression of participants). The evaluation was constructed as a multi-level programme and was designed to gather both quantitative and qualitative data.

Recruitment and registration to the project was undertaken by the main delivery partners. The target population for recruitment included all manufacturing SMEs in the NW area in the maturity range 3-15 years. An initial target of 160 participants was established, though actual recruitment reached 109 by the close of the project. External factors including the global Covid-19 pandemic and the impacts of Brexit impacted negatively on recruitment efforts. Various 'direct contact', 'network' and 'partnering' approaches to recruitment were trialled by the partners with the first of these proving to be the most effective by far.

The MC\_L intervention has a four stage configuration. (1) The Baseline stage involved interview/survey based data collection, registration to MC\_L and randomised allocation to the T or C pathway. (2) Business Profiling involved more detailed collection of data re: orientation to technologies. (3) 'Connect to Grow' and (4) 'Growth Demonstrator' were the main content delivery stages of the intervention.

MC\_L was delivered to a Pilot then six further cohorts of participants between January and December 2021. Of 109 participants, 51 were allocated to the T group and 58 to the C. Data was collected throughout the delivery process via participant surveys integrated into session activities, and surveys and interviews at the close of each cohort delivery and the delivery programme as a whole. The T and C groups formed the main comparators for the analysis.

Quantitative data provided the basis for descriptive and inferential analysis, relating primarily to issues of performance/effectiveness. The Inferential analysis finds that overall, there is little statistically significant difference in outcomes for the T and C groups. Descriptive statistics reveal a slightly different picture. Here we observe a moderate T effect in terms of retention/progression, and milder, though positive effects in relation to 'intention' and 'confidence'. Supplementary inferential analysis combined both groups and revealed that (a) intention to adopt declines slightly for both groups, (b) confidence is increased for both, and (c) timeline to adoption is reduced for both.

Results from the analysis of qualitative evidence – particularly that derived from a post-delivery interview programme with 53 participants - aid in nuancing the above. Intention and confidence with respect to adoption appear high for both T and C groups. The small decline in intention is reported to result from informed realism and enhanced understanding of the challenges of adoption. At three months following participation, 13 participants have moved to MC\_L inspired 'realised' adoption, and 13 more report MC\_L 'influenced' plans for near-term adoption.

Qualitative evidence also reveals strong participant satisfaction/experience (though ratings are higher for the T group). Quality of both the structure and content of the intervention is highlighted. The P2P component in delivery is also widely welcomed: access to expert views is perceived by T participants as the core factor in the intervention's success. Facilitators also record high levels of satisfaction and confidence in MC\_L: they report that the intervention is well-designed and effective with respect to all main aims.

Major findings are that the intervention appears to deliver effectively (in terms of core objectives) for both its T and C participants. Differences between T and C groups in terms of outcomes are relatively small (in statistical terms), though T participants report that the P2P component in the intervention is key to success and satisfaction. Participant progression is important: retention across the sequenced stages provides improved preparedness for technology adoption. MC\_L constitutes a well-evolved, mature and successful intervention programme. The learning derived from its design and operation imply that it is well-placed for scale-up and for delivery to a wider audience.

## Table of Contents

<b>1. Section One: Introduction .....</b>	<b>6</b>
1.1 MC_L in a Nutshell .....	6
1.2 Data Collection and Measurements .....	7
1.3 Project Rationale – Objective and Innovation .....	8
1.4 Research Questions .....	8
1.5 Structure of the Report .....	10
1.6 Acknowledgement .....	10
<b>2. Section Two: Methodology .....</b>	<b>11</b>
2.1 The Intervention .....	11
2.2 Intervention Logic Model .....	13
2.3 Participation in the Intervention .....	14
2.4 Implementation and Process Evaluation – Participation and Contributions .....	16
2.5 Evaluation Design .....	19
2.6 Sample Size and Participant Allocation .....	21
2.7 Summary .....	21
<b>3. Section Three: Presentation of Data and Results .....</b>	<b>23</b>
3.1 Statistical Analysis (utilising IGL Template) .....	24
3.2 Recruitment and Registration .....	93
3.2.1 Registration Process .....	93
3.2.2 Recruitment .....	94
3.2.3 Recruitment Statistics .....	94
3.2.4 Recruitment Performance by Partner .....	95
3.2.5 Recruitment Initiatives and Ameliorations .....	95
3.2.6 Hampering Factors .....	97
3.2.7 Summary and Key Points .....	99
3.3 Facilitator Feedback .....	100
3.3.1 Introduction .....	100
3.3.2 Project Initiation .....	101
3.3.3 Pilot Cohort .....	102
3.3.4 Facilitator Feedback - Post-Pilot .....	103
3.3.5 Facilitator Feedback – Quantitative Data .....	104
3.3.6 Summary .....	105

3.4 MC_L Facilitator Final Feedback Survey .....	106
3.4.1 Introduction .....	106
3.4.2 Analysis of Survey Responses.....	106
3.4.3 Summary and Key Points.....	114
3.5 Participant Feedback from Connect to Grow and Growth Demonstrator Surveys .....	116
3.5.1 Introduction .....	116
3.5.2 Participant Experience Ratings .....	116
3.5.3 Session Content and Delivery and Recommendations for Improvement ....	117
3.5.4 Summary.....	118
3.6 MC_L Participants: Final Interview Programme.....	119
3.6.1 Introduction .....	119
3.6.2 Participation .....	120
3.6.3 Elimination of Bias.....	120
3.6.4 Interview Content .....	121
3.6.5 Interview Programme: Findings.....	121
3.6.6 Experience of Engagement in MC_L and Implications for Decisions and Planning.....	130
3.6.7 Suggestions for Improvements.....	134
3.6.8 Summary and Key Findings .....	138
<b>4. Section Four: Key Findings and Discussion .....</b>	<b>141</b>
4.1 Research Questions .....	141
4.2 Additional Findings .....	143
4.3 Limitations (Evaluation) .....	144
4.4 Potential for Scale-Up.....	145
4.5 Closing Comments .....	146
<b>Appendix A .....</b>	<b>147</b>
<b>Appendix B .....</b>	<b>148</b>

## 1. Section One: Introduction

We report here on the evaluation of the Manufacturing Connect Lancashire (MC\_L) project. The project commenced in June 2020 and was completed in January 2022. The work was configured as an experiment and was created primarily to test the value of peer-to-peer (P2P) approaches in awareness-raising and knowledge-transfer interventions designed to support and encourage SMEs in the North West of England in the adoption of performance-enhancing technologies (for example ERP, MRP and CRM systems). The guiding hypothesis was that the use of P2P approaches (wherein intervention participants would have an opportunity to discuss their needs, aspirations and challenges with expert technology vendors and users) would be superior to identical awareness raising and knowledge-transfer interventions that do not have a P2P component.

### 1.1 MC\_L in a Nutshell

The experiment utilised a Randomised Control Trial methodology in which two groups of participants – one Treatment (T) and one Control (C) were recruited to take part in the intervention. In basic terms, the intervention comprised four components:

*Baseline (B) data collection* – gathering via telephone survey of data re: company characteristics, eligibility for entry to MC\_L, orientations to technology usage, and intentions with respect to technology adoption. At the close of the interviewer administered survey, prospective participants in the experiment were allocated randomly to either the T or C group.

*Business Profiling (BP)* – at this stage all registered participants took part in a further interviewer administered survey and were asked to respond to more detailed questions re: their actual and potential use of performance-enhancing technologies (and factors such as awareness, knowledge, confidence, barriers, and access to support and resources that might be implicated in their thinking and decisions).

*Connect to Grow (CtG)* – this session was designed to introduce participants to some of the main performance-enhancing technologies and to raise awareness with respect to the utility and benefits of the systems (in terms of business resilience, profitability, productivity and efficiency). Results from the BP session survey are used to underpin discussions and to highlight expressed needs and aspirations with respect to technologies.

*Growth Demonstrator (GD)* – the final session builds on CtG and uses data from the survey that is undertaken as the last action in the latter. The aim in GD sessions is to examine pathways to the implementation and realisation of performance improvements via the adoption of relevant technologies. Here, the focus is directed to building confidence, overcoming barriers, seeking

appropriate support, and planning in relation to investment in technology. The session closes with a readiness evaluation survey that mirrors the survey undertaken at the close of CtG.

Each of participants in the T and C groups is invited to progress through the four intervention stages. The T group pathway after BP involves on-line workshops with facilitated presentation of materials and discussion. Further, and importantly, the workshops feature experts from companies that have already adopted technologies, and experts from technology vendors. The workshops involve panel and breakout sessions in which it is possible for participants to discuss needs and questions with their peers and experts (this is the P2P element that is offered to T participants). The pathway for C group participants involves asynchronous and non-facilitated on-line delivery. Those in the C group are offered the same content as their T counterparts, though this is delivered in the form of presentations, text-based materials and video case studies. There is no opportunity to discuss ideas/questions with peers or experts. In this way, the experiment permits the comparison of data re: experience, perceptions and outcomes from the two groups, (a T group that is exposed to P2P interactions, and a C group that is not), and thus the testing of the central hypothesis with respect to the value and superiority of P2P-based interventions.

The project involved delivery of the intervention to seven cohorts (each comprised of a T and C group) of participants in the period January 2021 to December 2022. In total, 109 participants registered to take part in the intervention: 51 were allocated randomly to the T group, and 58 to the C group.

## **1.2 Data Collection and Measurements**

Each of the four sessions involves surveying and data collection. The data from each is important in driving some of the content in subsequent sessions, though in addition, data is collected with respect to the primary and secondary research questions at the core of the project. These questions (elaborated in full below) relate to:

Intention to adopt performance-enhancing technologies;  
Confidence with respect to adoption; and  
Timeline to adoption.

Again, in basic terms the project is designed to measure differences with respect to these questions between the two participant groups. We also measure differences between the two groups in terms of 'progression'. A secondary hypothesis for the project was that the P2P mediated nature of the T pathway would prove more 'sticky' than the non-P2P C route, and that T participants would be more likely to be retained within the project across the stages of the intervention.

### 1.3 Project Rationale – Objective and Innovation<sup>1</sup>

The project was driven fundamentally by a recognition of relatively poor productivity performance found among manufacturing SMEs in England, and especially those in the NW of the country. Smaller manufacturers have lagged behind their northern European counterparts for some time in terms of productivity, and so too they have lagged in the take-up of productivity enhancing technologies. This lack of take-up is perceived as an important barrier to the productivity improvements that will be required as UK businesses move to exploit the opportunities expected to emerge as post-Brexit Britain opens-up to expanded global trade relationships. The key objective and logic behind MC\_L was to test the performance of an intervention designed to build awareness, knowledge and confidence with respect to business technologies in terms of its ability to progress NW SMEs on the pathway to technology adoption, and thus towards enhanced productivity. The inclusion of two routes in the experiment would permit the team to evaluate the specific benefits to be gained from the embedding of a P2P component in the intervention. The project was also designed to align with the objectives of the Business Basics programme (conceived and operationalised by BEIS in the UK), insofar as the latter seeks innovative ways of encouraging the take-up of productivity enhancing technologies among UK businesses. The innovative component of MC\_L resides firmly in the P2P approach at the core of the intervention, however, there is much innovation too in the development of session content that is driven by ‘live’ participant-derived data, and thus aligned intimately with the expressed needs of those taking part at each stage of the intervention.

### 1.4 Research Questions

The research questions that drive the study – and that were set-out in the Trial Protocol (Annex B to this document) – are configured as follows:

#### Primary Research Question:

To what extent does peer-to-peer support within the ASP<sup>2</sup> intervention (*direct delivery*) increase intention to adopt (ItA) business technologies among NW SME manufacturing businesses (in the maturity range 3-15 years) over and above the level generated by standard (*indirect*) delivery?

‘*Direct*’ in this context refers to delivery that includes the P2P component, an opportunity to establish dialogue with other technology users, potential adopters, advisors and suppliers. This element of P2P interactions is believed to support participants’ progression through the programme in terms of both retention and the depth of the knowledge and confidence that is gained.

---

<sup>1</sup> Please see also the more detailed project rationale on p2 of Annex B

<sup>2</sup> Advanced Sprint Process (ASP) refers to the intervention scheme (developed by EHU) that was reconfigured to provide the platform for MC\_L



The primary research question references a concern to engage in examination of the impact (in terms of both extent and dynamics) that is generated by the inclusion of a P2P element in the intervention. The core interest here is to understand fully the extent to which P2P support increases 'intention to adopt', over and above indirect (standard and non-P2P mediated) delivery of the intervention. Though not stated explicitly, the concept of 'over and above' also applies in the secondary research questions listed below.

Given the nature of the work and the timescale involved, the trial was designed to investigate differentials in '*intention*' to adopt between the T and C groups. The investigation of 'intention' rather than 'realised' adoption was highlighted as a significant lag is frequently observed between recognition of the benefits or technology, creation of a business case, and actual movement to adoption and implementation. However, sensitivity to realised adoption was built-in to the evaluation via the inclusion of a participant-oriented 'Final Interview' programme (and as explained below, significant evidence of realised adoption was identified).

#### Secondary Research Questions:

To what extent and in what ways do *indirectly* and *directly* applied interventions respectively impact on:

1. The ability of participant businesses to recognise the benefits from productivity-enhancing technologies
2. The reduction or elimination of barriers and uncertainties in relation to adoption and implementation
3. Confidence with respect to identifying and securing appropriate advice and support
4. Timescales for adoption (i.e., acceleration of decisions and actions relating to ItA)
5. Participation in the ASP and progression to further stages of the ASP

We note here that during the course of intervention delivery, one of the secondary research questions, that relating to benefits recognition, was subsumed into the PRQ and another SRQ: the issue of benefits is covered in research questions relating to 'intention' and 'confidence' re: technology adoption. In addition - and on the basis of ongoing review inside the project and discussions with IGL - the issue of 'progression' across the stages of the intervention was formally embedded as a secondary research question. Participant progression and retention had been considered in the initial formulation of research questions, though it was on the basis of early project review that it was recognised as a potentially important indicator re: the impact of a P2P approach.

## **1.5 Structure of the Report**

Moving on from this short introductory and context-setting section, the report discusses the methodology deployed for both the intervention and its evaluation. Thus, Section Two provides further details in relation to: the design, structure and content of the intervention; project participation and the recruitment of participants into MC\_L; and, the design of the evaluation scheme and its process and performance elements. Section Three proceeds to set out the results from the project. Here we focus on presenting all of the quantitative and qualitative data collected during the delivery of the intervention and operation of the multi-level evaluation programme. We start here by presenting the quantitative data and provide a thoroughgoing analysis of the latter, relating this specifically to the research questions set-out above. In the following sub-section, we present the qualitative data, some of which relates to implementation and process issues, and some which complements the quantitative data and aids in nuancing and extending our analysis in relation to the research questions. We commence in the qualitative passages with a review of registration and recruitment, then transition to exploration of evidence provided by facilitators, then that derived from participant surveys and interviews. In the final passages (Section 4) we provide a discussion and interpretation of results and set-out the key findings from the study. Here, we also allude to the limitations of the work (and evaluation), and consider possibilities and directions for transition and scale-up of the MC\_L project. Appendices are provided at the close of the document and two annexes are included (consolidated interim reports and the trial protocol) to ensure full access to all relevant project, research and evaluation materials.

## **1.6 Acknowledgement**

The project and evaluation teams wish to acknowledge the generous support of BEIS/Innovate UK in funding this project and related research under the ambit of Business Basics 3. The guidance provided by colleagues at BEIS is also gratefully acknowledged. We also wish to add our thanks to colleagues at IGL Nesta for their advice, support and responsiveness throughout all aspects of the work.

## 2. Section Two: Methodology

In this section, we detail the methodologies employed in (a) the construction of the project and intervention as a whole, and (b) the development of the accompanying evaluation programme. The section commences with an overview of the organisation of the intervention and describes its various stages. We present the amended (post-delivery) project logic model and allude to the revisions to plan made necessary by the extant operating environment. The section moves on to a discussion of participation and recruitment and sets-out the realised timeline for project delivery activity. In the closing passages, we discuss the construction of the process evaluation scheme, and the design of the wider project evaluation of the programme.

### 2.1 The Intervention

As indicated in the introductory passages, the intervention – one designed to promote awareness and informed take-up of productivity-enhancing technologies – was delivered in two forms. First, for the T group, following telephone interviews at the BP stage, T group participants were involved in on-line CtG and GD workshops, both of 90 minutes duration, in which content was delivered by facilitators, and workshop discussions involved a P2P component. Workshops for each cohort were delivered on Tuesday mornings from 8.30am to 10.00am, with a one week gap between delivery of CtG and GD. Second, the C group was involved in on-line delivery of materials for self-directed study. Content was identical to that delivered in workshops, though configured as text-based materials and video case studies. These were delivered via email and links by the project team for asynchronous consumption at the participants' convenience (a 10 day window was permitted for each of the CtG and GD stages).

The four stages of the intervention are described in the section above. Here we set out the materials/content deployed in each.

**Baseline** – the baseline element was common to both groups and consisted in a telephone conversation with a trained facilitator. The session was structured around a survey and designed to gather company data and information in relation to orientations to technology usage. It was also designed to secure and facilitate registrations to the project. Initial questions covered issues of company eligibility, contact details, number of employees and turnover. Subsequent coverage included:

Levels of knowledge in relation to technologies

Levels of confidence in relation to technology capabilities (to meet business needs)

Existing levels of production automation and systems integration in the firm

Business priorities (in terms of profitability, demand, productivity and efficiency)

Levels of confidence with respect to adoption of technologies

Levels of intention to adopt technologies

Anticipated timescales for adoption

Levels of confidence in relation to addressing technology adoption issues and barriers

A percentage based rating was applied for each theme/question.

At the close of the session, participants were automatically allocated to either the T or C group (an electronic system was applied to ensure allocation concealment and prevent the intrusion of bias).

**Business Profiling** – again, this element was common and involved a telephone-based conversation with a trained facilitator. The session was designed to gather further and more detailed data from participants. Questions/themes addressed included:

Effectiveness of business planning (in relation to profitability, demand, productivity and efficiency)

Effectiveness with respect to performance monitoring

Effectiveness of current data in relation to visualising demand/opportunity

Effectiveness in terms of avoiding duplication and re-work

Business technology priorities: rating of knowledge re: production planning and materials resource planning technologies

Business management priorities: rating of knowledge re: customer relationship management technologies

Levels of confidence with respect to adoption of technologies

Levels of intention to adopt technologies

Anticipated timescales for adoption

Levels of confidence in relation to addressing adoption issues and barriers

Again, percentage-based ratings were applied for each question/theme

**Connect to Grow** – materials included in the CtG session are configured as follows:

Introduction – visualisation of data derived from the BP session (community benchmarking) in relation to business planning, performance monitoring and visibility of opportunities. Examination of expressed needs/expectations (in terms of manufacturing process automation, management systems integration, and timescales for adoption) of businesses in the cohort

Introduction of Challenge Themes – 1. improving performance monitoring, 2. driving sales and planning the pipeline, 3. improving communications (internal and external)

Impact Case Studies – examples of business performance improvement: Sales & Marketing Performance; Finance, People & Resource Efficiency; and, Production Planning and Management Performance (panel discussions and breakouts for T, video-cases for C)

Readiness Evaluation: reflections on performance issues and technology adoption considerations (online survey – addresses performance evaluation research questions)

Summary of key benefits re: sales and marketing technology (CRM), resource management technology and production planning technology (MRP) (plus discussion of next steps/session)

**Growth Demonstrator** – materials/themes included in the session:

Introduction: Learning from BP and CtG summary data, and implementing business performance improvements. Visualisations of community benchmarking data re: performance issues (and addressing these); confidence with respect to adoption; intention to adopt; needs with respect to process automation and management systems integration; timescales to adoption

Introduction of ‘implementation themes’: 1. Developing the business case for adoption – ROI; Finance, People & Resource Efficiency; Access to additional support and funding

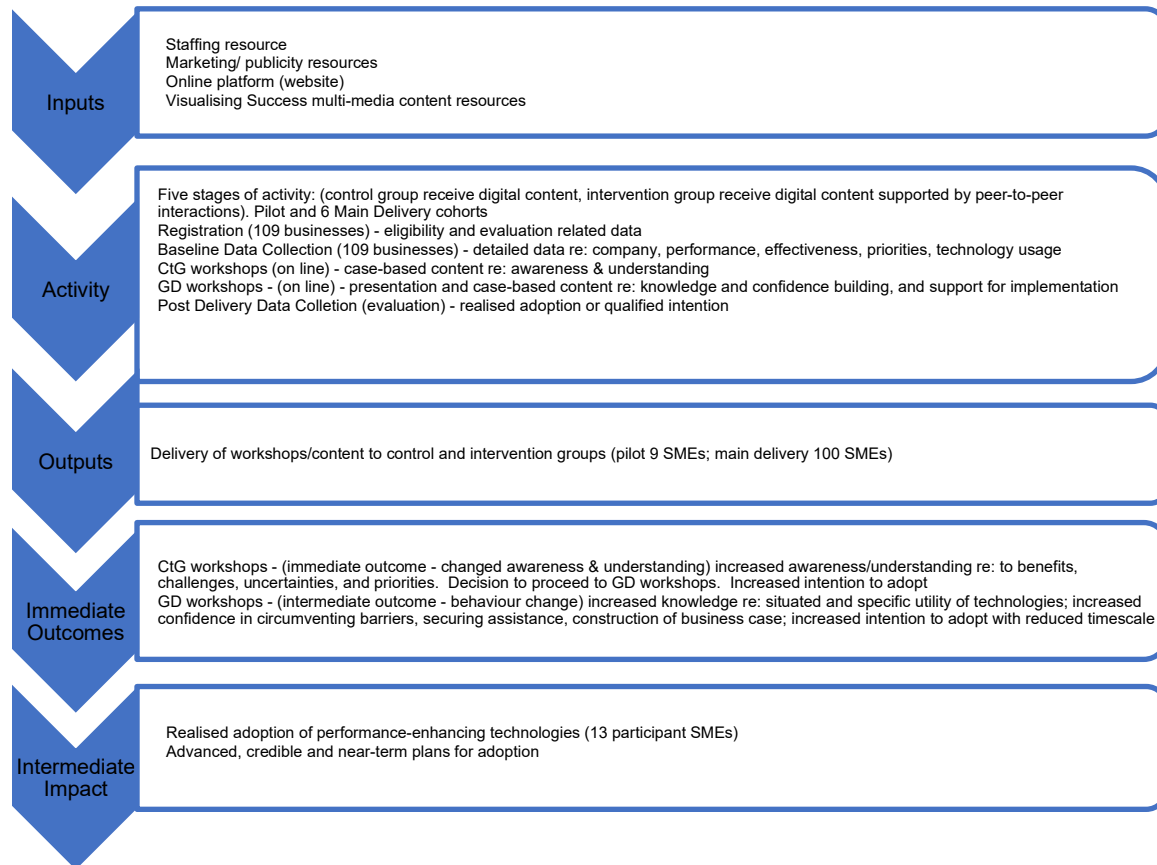
Impact case studies - Sales & Marketing Performance; Finance, People and Resource Efficiency; Production Planning and Management Performance (panel discussions and breakouts for T, video-cases for C)

Readiness Evaluation - key reflections on implementation and technology adoption considerations (online survey – addresses performance evaluation research questions)

Next steps and signposting to sources of further assistance and support (technology funding; business planning and strategy; and, technology implementation). Notification of Final Survey (3 months after completion)

## **2.2 Intervention Logic Model**

To underpin and supplement the above, the rationale and intended flow in relation to the intervention is set-out below in a logic model (this is adapted from the original in the Trial Protocol and reflects the actuality of participation and delivery). Here we list inputs, summary of activities (achieved), outputs (actual), immediate outcomes, and intermediate impacts (medium- to longer-term impacts are expected in the next 6-18 months)



Delivery of the intervention proceeded as expected following the decision to move all delivery on-line. It had been hoped that T workshops would take place as face-to-face events, though the intercession of the Covid-19 pandemic obviated the use of this approach. As explained elsewhere, the shift to online only is not perceived to have exerted any detrimental effect on the delivery or outcomes from MC\_L.

Consistency was assured throughout delivery (to seven cohorts) by stability in the delivery team and in the nature of content and facilitation styles. Minor revisions and refinements (insignificant in terms of the evaluation) were effected on the basis of facilitator and participant feedback to some elements of structure and content. These are set-out in later sections of the report.

### 2.3 Participation in the Intervention

Participants were recruited via two main routes and both main delivery partners were involved in efforts to identify and register eligible organisations. Much further detail appears below with respect to recruitment and registration processes, though in basic terms, Edge Hill University (EHU) personnel employed a 'direct contacts' approach wherein firms identified via a major commercial database of regional manufacturing SMEs were called by telephone and encouraged to participate in the project. EHU staff also exploited existing contacts with firms in its ambit and those that had attended previous business courses at the institution. AMRC colleagues initially

employed a networked (and 'network of networks') approach to recruitment and publicised the availability of places in MC\_L via its expansive range of business contacts. This approach was only minimally successful and adoption of the EHU 'direct' methodology was required later in the progression of the work. In addition to direct contacts, much project marketing activity took place via business publications, business support organisations and East Lancashire Chamber of Commerce. The latter was contracted as a partner in recruitment (to offer 'taster sessions'), though again performance was inadequate and the idea was jettisoned. EHU also experienced some success in recruitment via the use of a specialist business recruitment agency (this towards the later stages of delivery).

Eligible participants were defined as NW SME manufacturers in the maturity range 3-15 years. This range was selected as it captures those businesses that have reached a stage of development beyond start-up and initial survival. Further, businesses of such maturity are likely to have experienced some consolidation in their markets and some degree of growth and sophistication in their operations. Thus, they are likely to be potential beneficiaries of technology adoption, and may be positioned to access the resources that would facilitate this. A total population of 5300 manufacturing businesses was identified across the region via use of business directories and official sources.

As noted above, 109 businesses were registered for the intervention, 51 to the T route, and 58 to the C. All of these businesses were entered into the analysis with respect to the primary and secondary research questions. Given the structure of the intervention, there were no post-randomisation losses. Only one firm was removed from the population and analysis, and this as a result of discovery of non-eligibility (firm size).

Cohort recruitment (reported in detail elsewhere) took place as follows:

Pilot - December 2020/January 2021

Cohort 1 - February-April 2021

Cohort 2 - April-May 2021

Cohort 3 - May-July 2021

Cohort 4 - July-September 2021

Cohort 5 - September-October 2021

Cohort 6 - November-December 2021

Delivery of the intervention took place in January 2021 (Pilot), April 2021 (C1), May 2021 (C2), July 2021 (C3), August/September 2021 (C4), October/November (C5), and December (C6).

Follow-up (in terms of the Final Participant Interviews) was undertaken between 8 and 14 weeks after completion for each cohort. The initial intention had been to undertake follow-up at 12 weeks, though this was not always possible as a result of operational issues (not least significant

time pressure towards the end of the project following the insertion of an additional cohort into the schedule).

As might be expected, there was some attrition throughout the various stages of the intervention. This is reflected in the updated Flow Diagram below. The factors implicated in this along with substantial further detail in relation to retention and exit can be found in the following sections. Whilst completion was fairly pleasing, especially so given the circumstances in which the project was operationalised, a total of 58 firms (26 C and 29 T) participants transited all stages of the intervention i.e., B to GD. 95 firms were retained to the BP stage (50C and 45T) and 71 (36C and 35T) to the CtG stage. 53 businesses took part in the Final Interviews at approximately 3 months following completion of their cohort’s participation.

Baseline characteristics of participant businesses are examined in greater detail in the quantitative analysis section of this report, though we set-out the basics in the table below.

Variable	obs.	mean	std. dev.	min	max
Employee size	109	29.4037	34.3490	1	205
Turnover	109	3714134	5815946	0	30000000

With respect to employee size, the minimum in participating firms was 1 and the maximum was 205. Only a small number of single employee firms was involved in the project and some of these had been reduced to their current size by the impact of the Covid-19 pandemic. The mean number of employees was close to 30. The mean figure for turnover was £3.7m though at the extremes, turnover of zero and £30m was recorded. All businesses in the population were located in the NW of England. Hotspots for recruitment included: Blackburn (12), Preston (11), Burnley (9), Lancaster (7), and Chorley (6). This distribution is not surprising as these constitute the larger towns in the region.

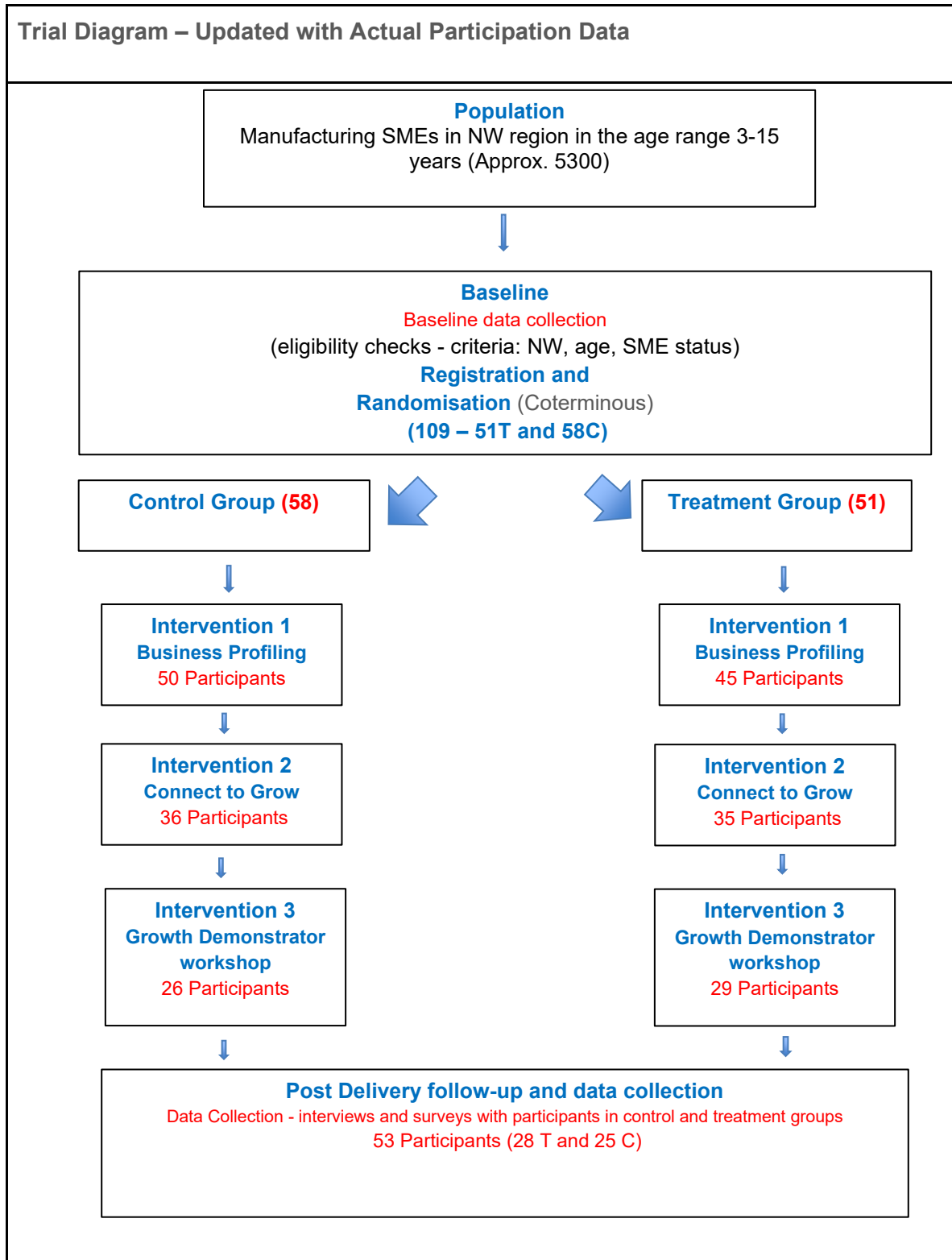
## 2.4 Implementation and Process Evaluation – Participation and Contributions

The process evaluation was constructed from a range of activities and involved inputs/data from project facilitators (managers, delivery staff and experts) and from participants in the intervention. Facilitators were asked to complete feedback surveys at the close of activities for each cohort, and to take part in a Final Survey (following completion of all delivery activity). Fifteen individuals can be identified as occupying a facilitator role, ten of these are internal to the project and five external (externals include representatives from vendor and technology adopter firms). Participants provided inputs via the surveys embedded in the CtG and GD sessions: their perceptions in relation to experience of the intervention, positive elements of the sessions and recommendations for improvements were valuable in terms of providing hints for refinements to content and structure (and to this end, were combined with those from facilitators). All participants were offered an opportunity to volunteer their view at the close of each session – almost all



provided ratings in terms of overall experience and quality of session content and delivery, though fewer provided more qualitative and explanatory detail. Fifty three agreed to take part in the Final Interview and are included in the analysis.

**Flow Diagram** (adapted and updated from the Trial Protocol)



## 2.5 Evaluation Design

The evaluation involved multiple levels, stages and activities, and multiple methods and techniques. It also involved development of both quantitative and qualitative datasets and for some elements of the analysis (and interpretation), the latter are blended. There are also two elements to the design. The programme was designed to facilitate data collection and analysis in relation to implementation and process themes, and also to support evaluation of performance elements of MC\_L, in particular those associated with the research questions. Approaches to, and operationalisation of data collection are set-out below.

**Quantitative data** – much effort in the design of the evaluation was dedicated to building a system that was capable of capturing quantitative data that would aid in addressing directly the primary and secondary research questions. To this end, four surveys – one at each stage of delivery - are embedded in the intervention materials. At B stage, participants complete a survey in which they are requested to provide data in relation to the themes of intention to adopt, confidence and timeline for adoption. These questions are repeated again at the BP interview stage (and questions in relation to barrier factors appear here too). The questions are again posed in the ‘Readiness Evaluation’ on-line surveys that are completed by all participants at the close of the CtG and GD sessions.

Further quantitative data is collected with respect to participants’ experiences of participation in the CtG and GD sessions. As noted earlier, participants are requested to score their experience (on a 1-10 scale), and to provide scores in relation to session content and delivery mode (again on a 1-10 scale).

A similar approach is adopted with respect to facilitators: the latter were asked to complete feedback surveys at the close of delivery to the first three and the final cohort, and ratings (1-10) were requested in relation to personal experience of involvement, perceptions of participant reception, and quality of content and approach.

In addition, there is some attempt to quantify elements of the qualitative data that is collected in the participant final interview (i.e., the interview that takes place at approximately three months after completion of delivery to each cohort). Specifically, qualitative evidence in relation to ‘intention to adopt’ was processed (via application of an agreed criteria set – see below in Section 3) in a manner that would permit the derivation of quantitative results. A five point scale was used to classify the ‘intention’ level of each company that participated in the interviews. A similar process was applied in relation to ‘experience and satisfaction’ data from the interviews and here the companies were classified on a three point scale as either negative, ambivalent/equivocal or positive.

**Qualitative data** – again from the outset of the project, there was a firm commitment to the collection of qualitative evidence in the expectation that this would prove valuable in relation to both understanding and evaluating process elements of the project, and in adding complementary granularity and detail to the quantitative analysis. In effect, if the quantitative data might supply ‘what’ answers with respect to research questions, then qualitative evidence would aid in illuminating the ‘why’ factors.

Qualitative data was collected from intervention participants via the readiness evaluation surveys at the close of CtG and GD events. In addition to the ‘ratings’ questions in these surveys, participants were requested to provide text based responses in relation to their perception of positives and negatives, and their views with respect to their ideas for improvements.

Similar qualitative data was collected from facilitators in the feedback surveys. The facilitators were asked to provide text-based responses to questions relating to positive and negative elements in workshop content and delivery, and the provision of ideas for refinements to the events.

The largest and most demanding element of the qualitative data collection scheme was the Final Interview programme. Here, participants in the intervention were asked (three months on from involvement in MC\_L) a range of questions with respect to their technology usage, aspirations, frustrations and plans.

The final component of qualitative data collection involved observation of the workshop sessions (for T participants), and structured questioning in regular project partner meetings. The data derived from these approaches was frequently blended with facilitator feedback and participant survey data, and used to aid in the development of recommendations with respect to issues of process (especially those relating to refinement of the intervention).

To summarise, extensive quantitative data collection was undertaken for each cohort via the surveys that were completed at each stage of delivery. Some further data was derived from quantification of qualitative evidence. Analysis of quantitative data was undertaken at the conclusion of activities for each cohort and descriptive and inferential statistics were reported in interim reports (for IGL and internal use) for six cohorts - please see Annex A for full details. Qualitative data was collected from both facilitators and participants in each cohort and again, this was analysed and findings were presented in interim reports. Reports on the data were also presented in project partner meetings and used to support the development of minor amendments to session content and process.

Evaluation plan – the evaluation plan (in relation to process and performance) was developed throughout the project start-up phase and embodied in the Trial Protocol agreed with both IGL and BEIS representatives in January 2021. Only minor changes to the plan were effected

throughout the project delivery phase, the most important of these, the insertion of more robust participant allocation processes following the Pilot delivery. Some further development of research instruments was undertaken in the early months of delivery, and conversations with IGL personnel were helpful in developing ideas and procedures with respect to modes of data analysis and reporting (especially that relating to quantitative data).

## **2.6 Sample Size and Participant Allocation**

The sample size for the experiment was determined initially on the basis of power calculations undertaken within the project team as the project application was in development. An initial target of 126 participants was derived using equations shared in Innovate UK bid development events. In start-up discussions with IGL and BEIS representatives, agreement was reached on uplift with respect to sample size and a new target of 160 participants was established. Given knowledge of the manufacturing SME population in the region, there was some scepticism among team members that the target might be reached. However, a commitment was given and recruitment strategies were established with the new target in focus. In the event, and against the backdrop of the global pandemic, the target was not reached, though 109 participants were recruited into the programme. The achievement of a recruitment figure at 68% of target was perceived internally as a very strong performance, especially so given the environment into which the project was launched. Please see Section Three for further detail in relation to registration and recruitment.

Assignment of participants to T and C groups was automated (via use of an electronic survey system) following completion of the Pilot. Allocation took place at the close of the Baseline survey activity and it was at this point that the specific intervention route was revealed to both recruiter and participant. With the assistance of IGL colleagues, steps were taken to ensure that a robust allocation concealment mechanism was established. Again, further detail in relation to allocation appears in Section Three.

## **2.7 Summary**

The section has provided context and background in relation to the study and has detailed the nature of the intervention and the four key stages through which both T and C participants progress. We discuss recruitment and registration to the project and also the characteristics of target participants. We also discuss the issue of randomisation and the process by which participants are allocated to the T and C groups. The timing of recruitment and delivery to the seven cohorts is set-out and we detail the attrition that was witnessed as participants progressed through the intervention. In the later paragraphs we explain the development of the evaluation plan and the various modes and tools applied in quantitative and qualitative data collection. We also detail the sample and allude to the problems that prevented achievement of the initially agreed target size. With this background to the project and explanation of methodology in place,

we turn our attention in the next section to presentation of the data and results derived from the operationalisation of the evaluation plan.

### **3. Section Three: Presentation of Data and Results**

In this section we present the detailed results from all aspects of the evaluation-related research. First, we set-out the main quantitative element of the study with a further explanation of methodology. We include all descriptive and inferential statistics with a comprehensive analysis in relation to each. For this presentation, we use the IGL Statistical Reporting Template. This provides a useful structure for the work and ensures comparison with the presentation of data from parallel studies in Business Basics 3. However, the formatting in the template varies from that in the rest of the report and sub-section numbering (whilst it has an internal logic for the document) does not match that used elsewhere.

In the following sub-sections we set-out the data from the qualitative elements of the study. However, we note that this data contains some elements of quantification (as described above). Whilst much of the work relates to process and implementation issues, some of the material connects directly with our research questions and complements the quantitative analysis in this regard.

The first qualitative sub-section addresses issues of recruitment and registration and we investigate in detail here some of the issues that were implicated in hampering recruitment and preventing achievement of the recruitment target. In the following sub-section we present data from the Facilitator Feedback Survey. This is followed by further material relating to facilitator perceptions as these were expressed in the Final Facilitator Feedback survey exercise.

Next, we move to present the data from the Participant Surveys that were embedded in the readiness evaluation element of the online CtG and GD sessions. The final sub-section reports on analysis and findings from the Participant Final Survey. There is an extended analysis here and we reflect in detail on the implications of outcomes for some of our key research questions.

### 3.1 Statistical Analysis (utilising IGL Template)

#### STATISTICAL ANALYSIS FOR RANDOMISED TRIALS MANUFACTURING CONNECT\_LANCASHIRE PROJECT

##### 1. INTRODUCTION

1.1 Project title	Manufacturing Connect_Lancashire
1.2 Trial protocol	1 <sup>st</sup> February 2021 version 15
1.3 Trial registration	The trial has been registered with AER. The registration number is: AEARCTR-0006707 The public URL for the trial is: <a href="http://www.socialscienceregistry.org/trials/6707">http://www.socialscienceregistry.org/trials/6707</a>
1.4 Author(s) of statistical analysis plan	Lawrence Green (MMU) Evaluator MMU Qi Cao (MMU) Evaluator MMU Sabaa Jahangir (MMU) Evaluator MMU

##### 2. DOCUMENT HISTORY

---

Version number	Date	Significant changes made
v1	14 <sup>th</sup> June 2021	N/A
V2	17 <sup>th</sup> Jan 2022	N/A
V3	24 <sup>th</sup> Feb 2022	N/A

---



### 3. LOGIC MODEL

---

**Has the project’s logic model (setting out the underlying logic or theory of change and a set of assumptions about how an intervention works) changed since the trial protocol was completed?** If yes, insert an updated version of the logic model and a brief description of the changes below.

No

The logic model remains the same as outlined in the trial protocol. However, one of the secondary research questions, that relating to benefits recognition, has been subsumed into the PRQs and an SRQ. The issues of benefits is covered in research questions relating to ‘intention’ and ‘confidence’ with respect to technology adoption. A further secondary research question was added in relation to the impact of P2P approaches with respect to participant progression and retention. This is explained in Section Two above.

---

#### 4. PRELIMINARY CHECKS

Describe the checks that will be carried out before beginning data analysis. This will normally include a check that the treatment and control groups are balanced in their baseline (pre-intervention) characteristics, as a confirmation that the randomisation worked as expected and that there has not been significant attrition bias.

##### 4.0 Variables measures and descriptions

<b>Variables</b>	<b>Labels</b>	<b>Measurement</b>	<b>Survey Questionnaire Q.</b>
Confidence	Confidence level to adopt technology as a percentage score (0-100%)	Continuous measure 0-100%	<p>1.6.0 Baseline Survey: Please rate your current level of confidence with respect to the adoption of performance enhancing business technologies</p> <p>3.3.0 Business Profile Survey: Please indicate your current level of confidence for adopting production automation technologies?</p> <p>4.3.0 CtG Survey: Please indicate your current level of confidence for adopting your prioritised technology</p> <p>5.4.3 GD Survey: Please indicate your current level of confidence for adopting your prioritised technology</p>
Intention	Intention level to adopt technology as a percentage score (0-100%)	Continuous measure 0-100%	<p>1.7.0 Baseline Survey: Please rate your current level of intention to adopt performance enhancing business technologies</p> <p>3.4.0 Business Profile Survey: Please indicate your current level of intention to adopt new business technologies?</p> <p>4.4.0 CtG Survey: Please indicate your current level of intention to adopt new business technologies?</p> <p>5.4.4 GD Survey: Please indicate your current level of intention to adopt new business technologies?</p>
Time Scale	Time Scale to adopt technology, five categories, 3, 6, 9, 12 months, and None	Categorical measure	<p>1.8.0 Baseline Survey: Please select one of the following as an anticipated timescale for adoption</p> <p>3.5.0 Business Profile Survey: Please select one of the following as an anticipated timescale for adoption</p>

Employee Size	Employee size as total staff number	Continuous measure	4.5.0 CtG Survey: Please select one of the following as an anticipated timescale for adoption 5.4.5 GD Survey: Please select one of the following as an anticipated timescale for adoption Baseline Questionnaire: Total staff headcount
Turnover	Annual turnover £ (last completed financial year)	Continuous measure	Baseline Questionnaire: Annual turnover £ (last completed financial year)

#### 4.1 Baseline quantitative measures

<b>Variables</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Confidence_baseline	109	61.7431	25.0127	0	100
Intention_baseline	109	78.7156	20.6873	10	100
Time_Scale_baseline	109	10.0459	7.6199	3	12
Employee_baseline	109	29.4037	34.3490	1	205
Turnover_baseline	109	3714134	5815946	0	30000000
Confidence_business_profile	95	60.5263	23.4461	0	100
Intention_business_profile	95	77.8947	19.1797	20	100
Time_Scale_business_profile	95	9.5368	6.4459	3	12
Employee_business_profile	95	31.5053	36.1398	1	205
Turnover_business_profile	95	4061932	6124644	0	30000000
Confidence_ctg	71	65.2113	22.7319	0	100
Intention_ctg	71	76.3380	21.5300	0	100
Time_Scale_ctg	71	8.6620	4.8519	0	12
Employee_ctg	71	31.6620	33.7134	1	180
Turnover_ctg	71	4194276	6088032	0	30000000
Confidence_gd	55	67.4546	25.4746	0	100
Intention_gd	55	73.6364	26.2723	0	100
Time_Scale_gd	55	8.4000	5.5197	0	12
Employee_gd	55	28.0364	30.8178	1	180
Turnover_gd	55	3764701	5555983	0	30000000

#### 4.2 Balance Checks

4.2.1 Means of the baseline characteristics in each of the treatment and control groups.

Table 4.2.1.1 Means of the baseline characteristics in each of the treatment and control groups.

Baseline model	Obs.	Confidence	Intention	Timescale	Employee size	Turnover
Treatment Group	51	64.31373	81.56863	10.58824	30.11765	3988003
Control Group	58	59.48276	76.2069	9.568966	28.77586	3473318

Table 4.2.1.2 Means of the business profile characteristics in each of the treatment and control groups.

Business Profile	Obs.	Confidence	Intention	Timescale	Employee size	Turnover
Treatment Group	45	57.77778	76.44444	10	32.08889	4282803
Control Group	50	63	79.2	9.12	30.98	3863149

Table 4.2.1.3 Means of the ctg characteristics in each of the treatment and control groups.

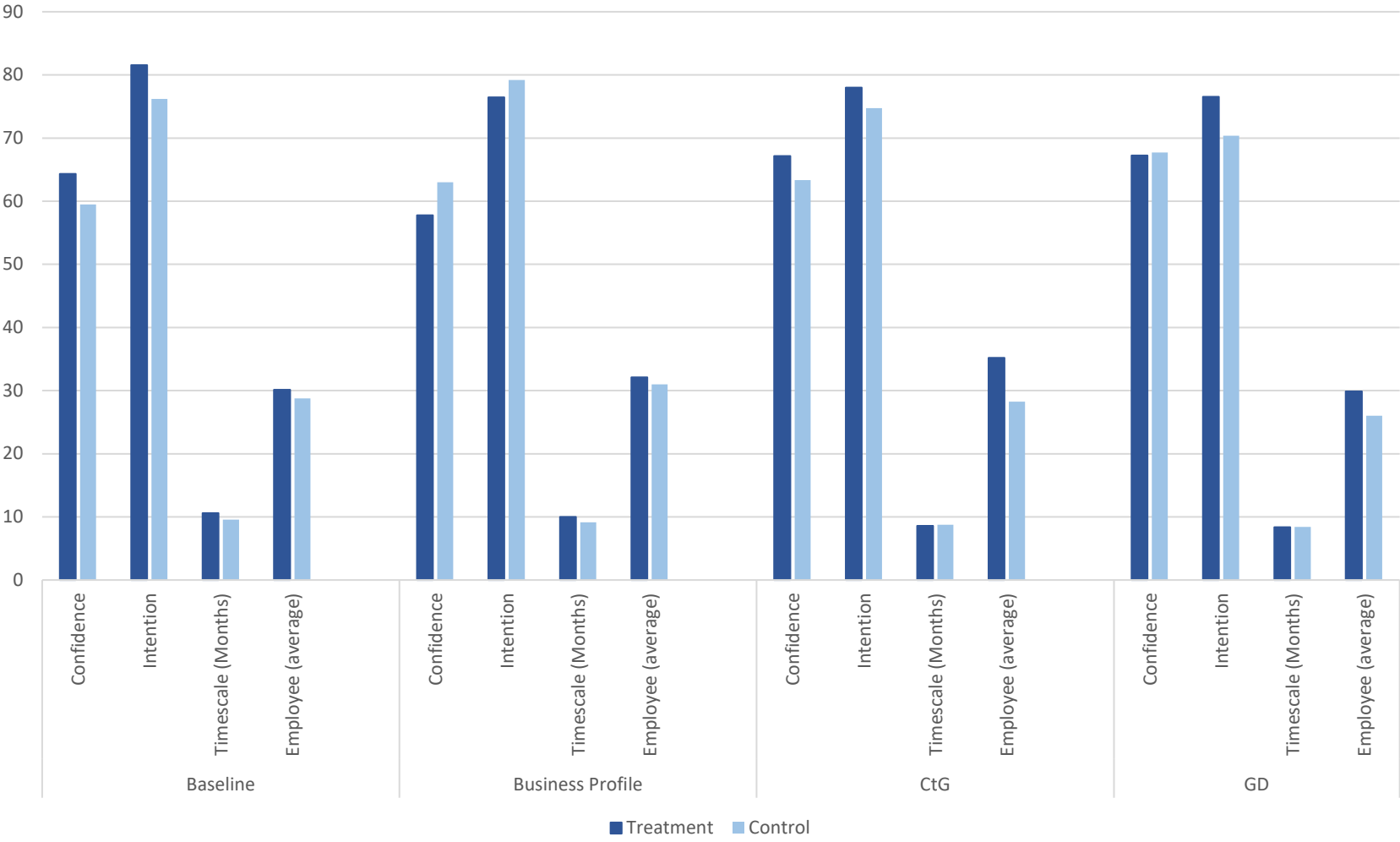
CtG	Obs.	Confidence	Intention	Timescale	Employee size	Turnover
Treatment Group	35	67.14286	78	8.571429	35.17143	4838747
Control Group	36	63.33333	74.72222	8.75	28.25	3567707

Table 4.2.1.4 Means of the gd characteristics in each of the treatment and control groups.

GD	Obs.	Confidence	Intention	Timescale	Employee size	Turnover
Treatment Group	29	67.24138	76.55172	8.37931	29.86207	4116522
Control Group	26	67.69231	70.38462	8.423077	26	3372286

Chart 4.2.1.1 Mean value comparison of all stages

# Mean Value Comparison between Treatment and Control Groups



4.2.2 F-test for joint significance in predicting treatment status: baseline model and business profile model.

**Balance checks:** F-test for joint significance to explore whether demographics have an impact on the treatment status. In this case, F-test for joint significance with Employee size and Turnover on Baseline and Business Profile stages.

Unrestricted Model:

$$f(x)_{treatment\ i} = \beta_0 + \beta_1 Confidence_i + \beta_2 Intention_i + \beta_3 TimeScale_i + \beta_4 EmployeeSize_i + \beta_5 Turnover_i + \varepsilon_i$$

Restricted Model

$$f(x)_{treatment\ i} = \beta_0 + \beta_1 Confidence_i + \beta_2 Intention_i + \beta_3 TimeScale_i + \varepsilon_i$$

1) Test among treatment and control sample with baseline model confirm that the demographics, i.e. employee size and turnover, have no significant impact on treatment assignment ( $F_{2,103} = 0.4327 < F_{2,120}$  (at  $\alpha = 0.10$ ) 2.3473)

2) Test among treatment and control sample with business profile model confirm that the demographics, i.e. employee size and turnover, have no significant impact on treatment assignment ( $F_{2,89} = 0.2124 < F_{2,120}$  (at  $\alpha = 0.10$ ) 2.3473) (See Appendix 1 for more details). Treatment assignment passes the balance checks and tests indicate no significant issues with the assignment to control and treatment groups.

4.3 **Power calculations** indicate the minimum sample size needed to provide precise estimates of the program impact

Two sample comparison of means:

Baseline model

Baseline model	Obs.	Confidence	Intention	Timescale	Employee size	Turnover
Mean Treatment	51	64.31373	81.56863	10.58824	30.11765	3988003
S.D. Treatment	51	24.1121	20.1341	8.0663	34.5467	6366107
Mean Control	58	59.48276	76.2069	9.568966	28.77586	3473318
S.D. Control	58	25.3542	20.6638	7.1005	33.8628	5217746

4.3.1 Minimum detectable effect based on employee size in baseline data

Assumptions:

alpha = 0.0500 (two-sided); power = 0.9000; m1 = 30.1177, m2 = 28.7759; sd1 = 34.5467, sd2 = 33.8628;

n2/n1 = 1.00

Estimated required sample sizes: n1 = 13658, n2 = 13658

4.3.2 Minimum detectable effect based on employee size in baseline data

Assumptions:

alpha = 0.0500 (two-sided); m1 = 30.1177, m2 = 28.7759; sd1 = 34.5467, sd2 = 33.8628;

sample size n1 = 51, n2 = 58; n2/n1 = 1.14

Estimated power: power = 0.0548

### 4.3.3 Minimum detectable effect based on Intention Score in baseline data

Assumptions:

alpha = 0.0500 (two-sided); m1 = 81.5686, m2 = 76.2069; sd1 = 20.1341, sd2 = 20.6638;

sample size n1 = 51, n2 = 58, n2/n1 = 1.14;

Estimated power: power = 0.2781

Power calculations indicate that the final sample size is not ideal. For example, with respect to 'intention' data, the explanatory power of the model is 27.81%.

### 4.3.4 Minimum detectable effect for progression

Assumptions:

alpha = 0.5 (two-sided), sample size n1 = 51, n2 = 58, power = 0.8, m2 = 0.45

minimum detectable effect size: 0.26

In this case to be 80% confident of detecting an effect from the treatment with respect to progression, a progression rate of at least 71% would be required in the Treatment group

## 5. CONSTRUCTION OF KEY VARIABLES

### 5.1 Outcome measures

Primary or secondary outcome?	Description of variable	Detailed definition (referring to question numbers from survey instruments, if applicable)	Any significant changes made since the trial protocol
P	intention to adopt	Survey questions: 1.7.0 Baseline Survey 3.4.0 Business Profile Survey 4.4.0 CtG Survey 5.4.4 GD Survey	
S	Confidence with respect to identifying and securing appropriate advice and support	Survey questions: 1.6.0 Baseline Survey 3.3.0 Business Profile Survey 4.3.0 CtG Survey 5.4.3 GD Survey	
S	Timescales for adoption (i.e., acceleration of decisions and actions relating to ItA)	Survey questions: 1.8.0 Baseline Survey 3.5.0 Business Profile Survey 4.5.0 CtG Survey 5.4.5 GD Survey	

S	Participation/Progression Rate	Based on attrition and progression data of all cohorts	Added
---	--------------------------------	--	-------

## 5.2 Control variables

Describe the construction of each of the variables that will be used as control variables/covariates in your main analysis, if any.

<b>Description of variable</b>	<b>Detailed definition</b> (referring to question numbers from survey instruments, if applicable)
Employee size	Baseline survey: Total staff headcount
Turnover	Baseline survey: Annual turnover £ (last completed financial year)
Treatment	Baseline survey: Treatment

## 6. DATA CLEANING

	<b>Primary approach to be used</b>	<b>Any alternative approaches to be used as robustness checks</b>
<b>Handling of missing data in outcome measures</b>	Exclude observations	No
<b>Handling of missing data in covariates</b>	Replace with the unconditional mean of the variable in the non-missing observations	No
<b>Criteria to be used to exclude observations from the analysis</b>	None	



---

<b>Primary approach to be used</b>	<b>Any alternative approaches to be used as robustness checks</b>
<b>Any additional data cleaning</b>	None

---

## 7. MAIN ANALYSIS

	<b>Primary approach to be used</b>	<b>Any alternative approaches to be used as robustness checks</b>
<b>Type of treatment effect to be estimated</b>	Independent sample two group comparison of means	Comparison of means with bootstrap (to reflect non-optimal sample size)
<b>Treatment groups to be compared</b>	treatment group against control group	No
<b>Type of statistical test</b>	Independent sample two group comparison of means	In the case of insufficient sample size (against minimum effective size), t-test with bootstrapping will be performed.
<b>Covariates</b>	OLS and GLS is not applicable in the case of covariate tests.	GLS given the panel data with multiple stages
<b>Weighting of observations</b>	equally	
<b>Accounting for clustering in sampling or randomisation</b>	N/A	
<b>Subgroup analysis</b>	None	
<b>Correction for multiple comparisons</b>	None	
<b>Statistics to be reported</b>	Point estimates, 95% confidence intervals and continuous p-values	

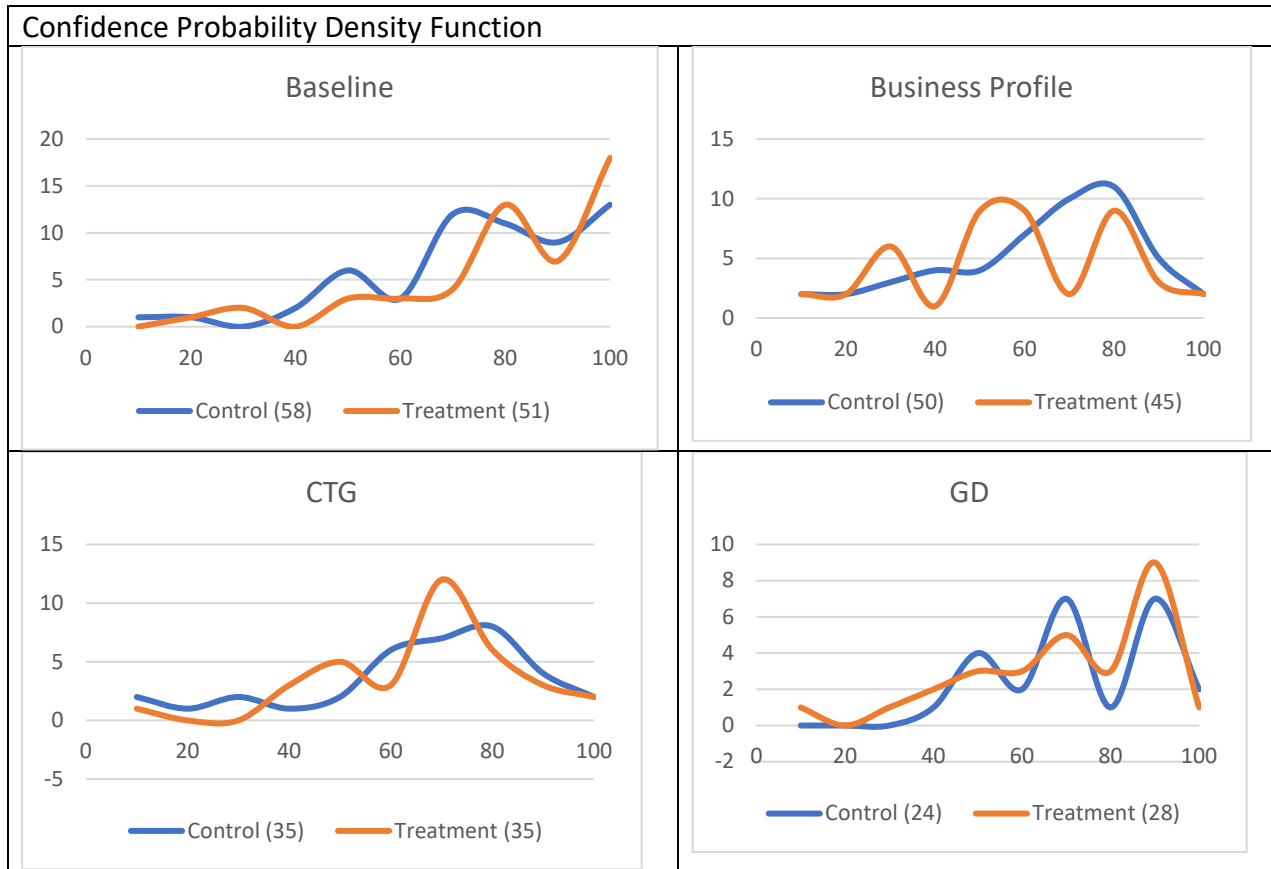
### 7.1 Aggregated Data: Descriptive Statistics

This section provides an overall summary of the aggregated data from seven intervention cohorts (the pilot and six main cohorts). In our analysis of the effects and effectiveness of the intervention, surveys were carried out at four key stages in the delivery process: thus, we present and analyse data from Baseline (B), Business Profiling (BP), Connect to Grow (CtG) and Growth Demonstrator (GD) surveys for each cohort.

#### 7.1.1 Distribution of the outcomes for treatment and control groups

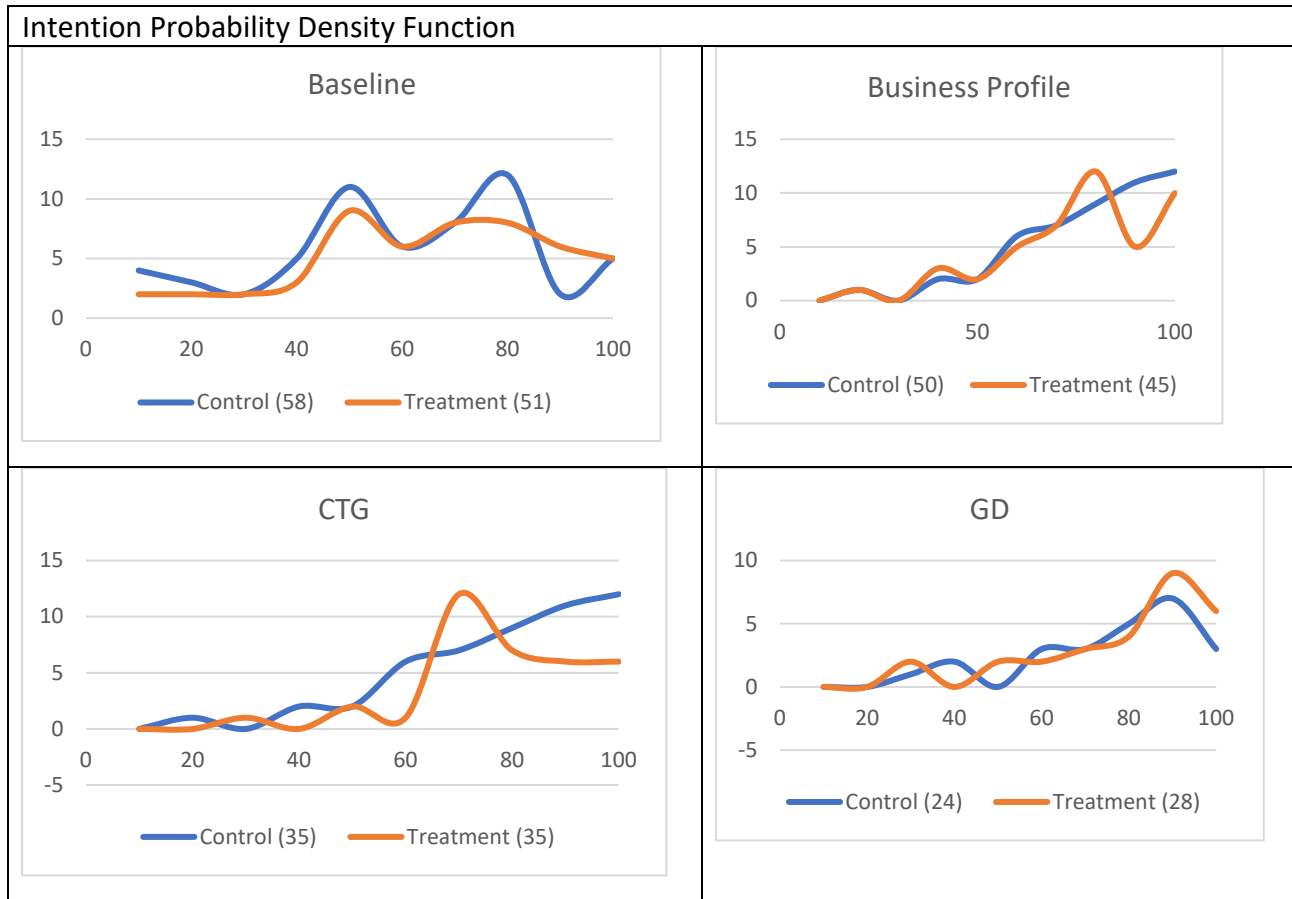
The pre and post-intervention probability distributions for each of the studied outcome are shown separately for the treatment and control groups.

Figure 7.1.1.1 Probability Density Function of Confidence level for Treatment and Control Groups



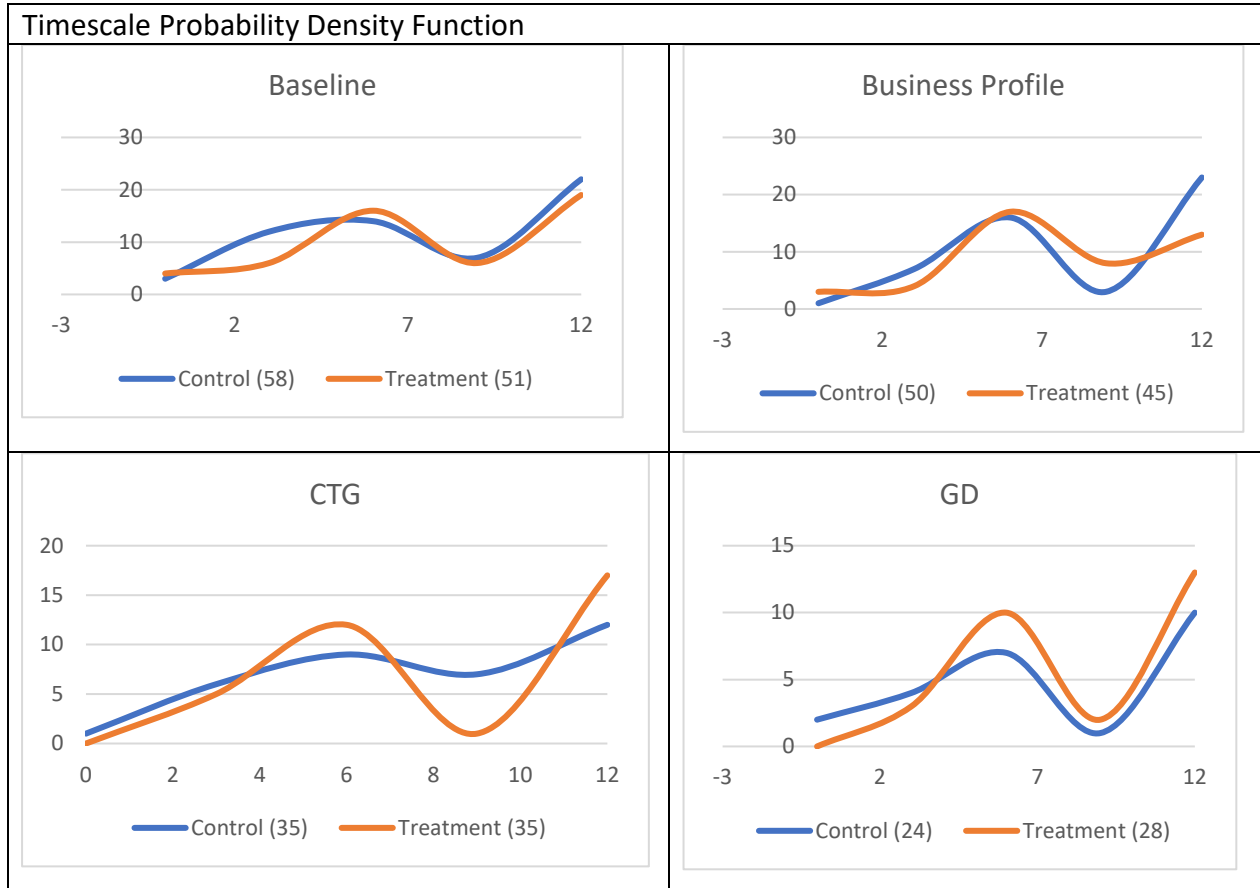
The distribution of confidence levels varies across the different stages, this is not unexpected as the sample sizes reduce over the course of the intervention. In the Baseline data the distribution of 'confidence' between Control and Treatment groups appears to be quite similar in terms of spread. By the Business Profile stage, while for the Treatment group the distribution is varied with both bell-shaped middle, and bell-shaped tails, the distribution of the Control group seems to be skewed to the right, indicating higher levels of confidence. At Connect to Grow stage the right-hand skew remains (though slightly) for the Control group, and a similar skew is evident for the Treatment group. By the GD stage the distribution of both groups seems to be similar in shape again, with higher values at the right of the distribution.

Figure 7.1.1.2 Probability Density Function of Intention level for Treatment and Control Groups



With regards to the distribution of responses, at the Baseline stage ‘intention to adopt’ is largely similar for both the Control and Treatment groups. It changes significantly at the Business Profile stage and is skewed to the right side of the distribution for both groups: this trend is also evident at the CTG and GD stages where trends are largely the same for both Control and Treatment groups.

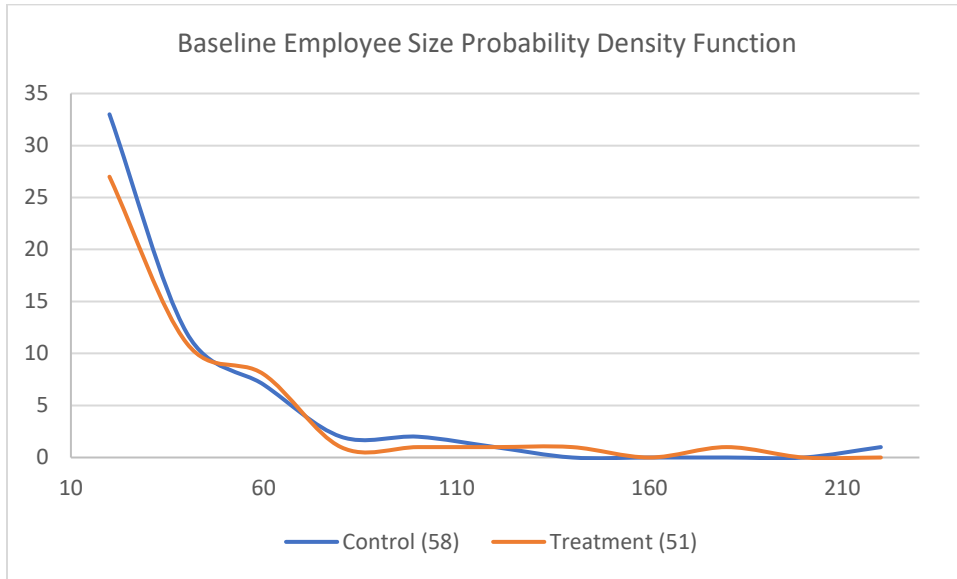
Figure 7.1.1.3 Probability Density Function of Timescale for Treatment and Control Groups



In terms of the distributions of intended ‘timescales for adoption’, for both Control and Treatment groups, these are very similar at all four stages of the intervention. Moreover, for all four stages the most common values seem to be at the higher end of the distribution for both groups.

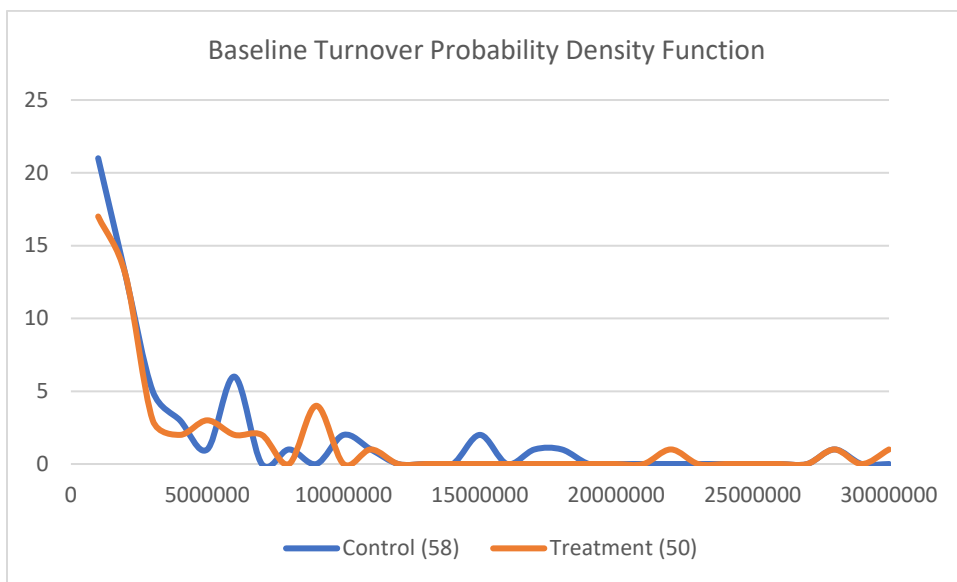
In terms of the distribution of number of staff in the organisations, as indicated in the graph below, values are significantly skewed towards the lower end of the distribution for both the Treatment and Control groups. This highlights that a significant proportion of the sample had numbers of staff at the lower end of the distribution, and very few firms demonstrated values at the higher end of the distribution.

Figure 7.1.1.4 Probability Density Function of Employee size for Treatment and Control Groups



Similar to staff numbers, the distribution of turnover for both the Control and Treatment groups is again at the lower end of the distribution, with a few extreme values at the higher end. Trends for both the Control and Treatment groups appear to be in-line. However, some volatility is evident in the distribution with several frequency spikes.

Figure 7.1.1.5 Probability Density Function of Turnover for Treatment and Control Groups



### 7.1.2 Intention to Adopt (ItA)

‘Intention to adopt’ technologies is a key variable in our analysis and is connected directly with our Primary Research Question. Intention to adopt, and changes in this for the Treatment (T) and Control (C) groups respectively throughout the intervention is of substantial interest as we monitor the relative effectiveness of the intervention in its ‘peer’ (direct) and ‘non-peer’ (indirect) modes of delivery.

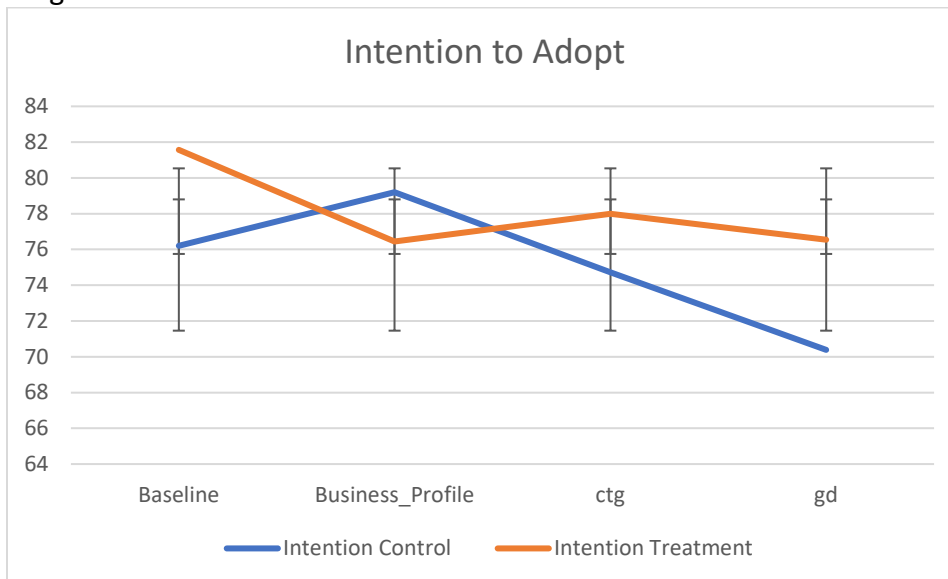
With respect to ‘intention to adopt’, the difference between the Control and Treatment groups is reasonably pronounced, though for both groups, intention decreases overall across the different stages. At the last stage of the process, GD, intention to adopt stands at 70% in the Control group and 77% in the Treatment group. However, intention across the four stages demonstrates greater volatility. For example, in the Control group intention stands at 76% at the baseline, rises to 79% in BP, diminishes to 75% CtG, and decreases again to 70% at growth demonstrator stage. In the Treatment group, baseline intention to adopt is 82% on average. This then reduces to 76% at BP, increases to 78% at CtG, then decreases slightly to 77% at GD stage.

Table 7.1 Intention to Adopt Performance Enhancing Technology

Intention to Adopt Performance Enhancing Technology				
	B	BP	CtG	GD
Control	76	79(+3%)	75(-3%)	70(-5%)
Treatment	82	76(-6%)	78(+2%)	77(-1%)

The trajectories for ‘intention to adopt’ are further illustrated in figure 7.1.2 below. In the Control group intention increases at the business profile stage, but gradually reduces at CtG and GD stages. The direction of the Treatment group is almost completely the opposite, it commences at a high level in the baseline, reduces quite dramatically in BP, and is then remains relatively linear in CtG and GD.

Diagram 7.1 Trend observation of intention levels



We conclude that for both the Treatment and Control groups ‘intention’ becomes reduced throughout the intervention, though marginally less-so for the former. We also note that ‘intention’ commences at a fairly high-level and that any reduction is relatively slight: there is a strong level of intention for both groups at the completion of participation. The cause of any decline is related to increased knowledge of the implications, challenges and requirements of a move towards technology adoption. The companies learn throughout of the organizational changes (and other demands) that come into play in relation to implementation and accommodation of the technologies, and develop a more informed, nuanced and situated view with respect to practicality, feasibility, planning and desirability. We also conclude that the peer element of the Treatment approach provides benefits in terms of tailored advice and direct dialogue in relation to addressing participant’s specified challenges, and that this implicated in a comparatively linear pattern in this group with respect to intention to adopt. The standard deviation error bars indicate some significant variation around the average levels of intention at each stage.

### 7.1.3 Confidence in relation to Adoption

With respect to confidence in relation to adoption, as indicated in Table 7.1.2 below, overall confidence tends to increase across the stages for both the Control group and Treatment groups. For the former, confidence increased by 4% at BP stage, remained stable at CtG and increased by 4% at GD stage. In comparison, in the Treatment group, confidence was recorded at 64% at Baseline, then decreased by 6% at BP, increased by 9% at CtG and remained stable at 0% in GD.

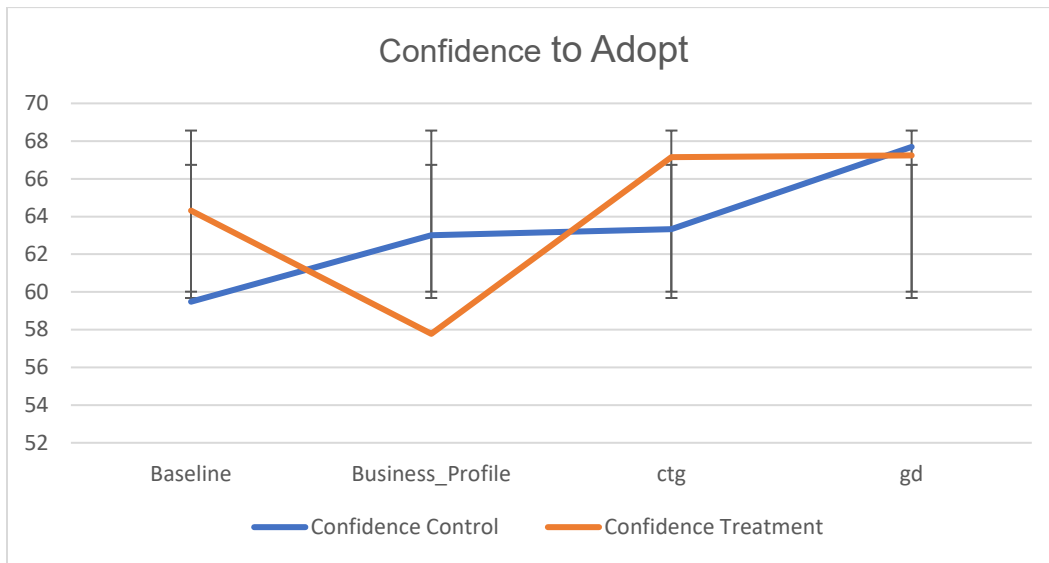
Table 7.2 Confidence to Adopt Performance Enhancing Technology

Confidence to Adopt Performance Enhancing Technology				
	Baseline	Business Profile	CtG	GD
Control	59	63 (+4%)	63 (+0%)	68 (+4%)
Treatment	64	58 (-6%)	67 (+9%)	67 (+0%)

The differences between confidence trajectories in the Control and Treatment groups is illustrated in Diagram 7.2 below. Overall, for both groups, confidence levels increase over the time period, and largely remain in-line and similar. We conclude that this highlights the positive effect of the intervention (in either its peer-to-peer or non\_P2P form) on confidence in relation to the adoption of performance enhancing technologies for both the Treatment and Control groups. It is worth noting too that confidence appears to increase in particular in the post-BP stages. It is in these two later stages that the intervention introduces materials that are designed specifically to surface and address real-world technology adoption themes, and to demonstrate approaches to (and routes for) confronting adoption and implementation challenges. The standard deviation error bars indicate some significant variation around the average levels of intention at each stage.



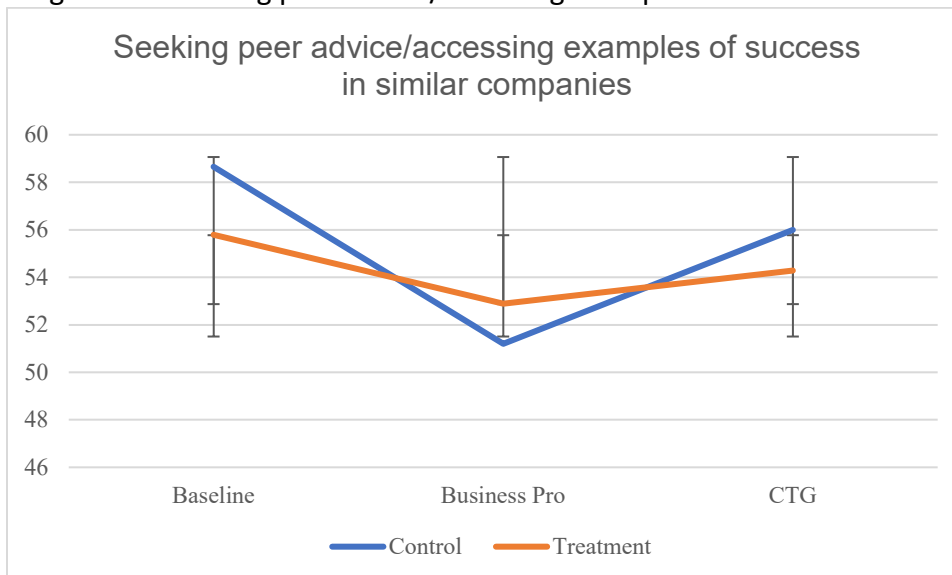
Diagram 7.2 Trend observation of confidence levels



#### 7.1.4 Confidence in Relation to Specific Adoption Issues

When assessing the influence of the intervention in terms of 'confidence to adopt', it is instructive to consider confidence in relation to specific technology adoption issues. One important variable is confidence with respect to 'securing peer advice' (and examples of best practice): absence of the latter is perceived to have the potential to hamper adoption, and is an issue that the intervention is designed to address. As indicated in Diagram 7.3 below, between the B and BP stages, confidence re: securing advice declines by 7% and 3% in the Control and Treatment groups respectively. However, by the CtG stage, confidence increases by 5% in the Control group, and 1% in the Treatment group.

Diagram 7.3 Seeking peer advice/accessing examples of success in similar companies<sup>3</sup>

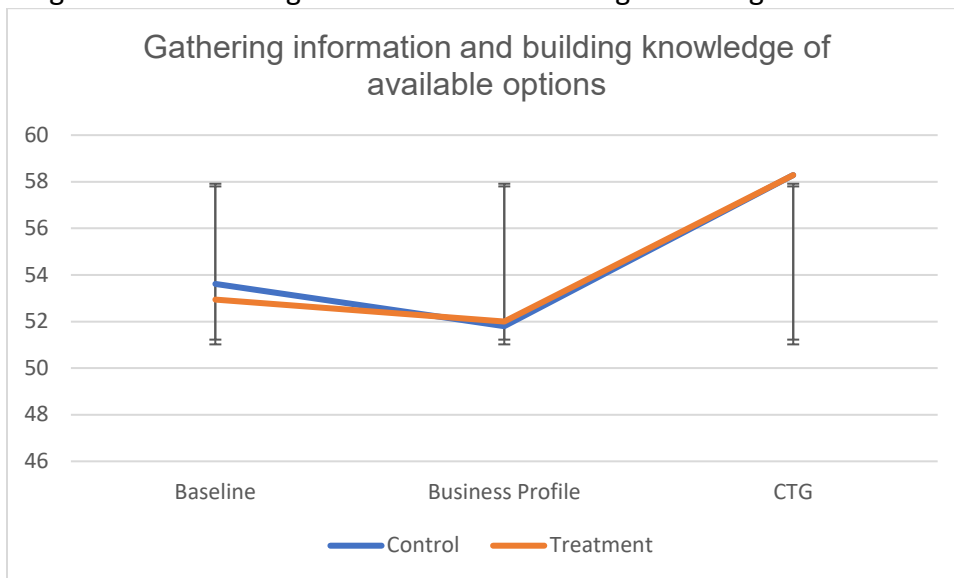


<sup>3</sup> Data is available only for the B to CtG stages

We surmise that the positive trajectory that appears at the post BP stage is connected with the introduction of materials in CtG (and beyond) relating to approaches to securing support, development of in-house capability, and signposting to potential sources of advice. Whilst, there is little difference between the trajectories of the T and C groups, the intervention appears to impart a positive and valuable impact in terms of raising confidence for all participants in relation to seeking advice and accessing example-based support from experienced users. The standard deviation error bars indicate some significant variation around the average levels of intention at each stage.

Another potential inhibitor of adoption confidence relates to a firm’s ability to gather information and build knowledge in relation to available technology options. Results of our analysis indicate that overall confidence in relation to information gathering and knowledge building is increased for both Treatment and Control groups throughout the intervention. The confidence trajectories (Diagram 7.4) are almost identical for both the T and C groups: confidence decreased slightly (3%) between the B and BP stages, though a substantial increase (6%) is observed for both groups at the CtG stage. The standard deviation error bars indicate some significant variation around the average levels of intention at each stage.

Diagram 7.4 Gathering information and building knowledge of available options<sup>4</sup>



We conclude here that the outcome evident in the diagram above is a positive one for the intervention as a whole. Whilst there is little observable difference between the T and C groups, the impact of the intervention in terms of increasing participants’ confidence in relation to accessing information and building knowledge is positive and substantial.

### 7.1.5 Timescale for Adoption

<sup>4</sup> Data is available only for the B to CtG stages

Anticipated timescale for technology adoption is a further important variable to be considered when assessing the effectiveness of the intervention (again, the issue of timescale is embodied in a SRQ). We are interested in particular to understand how reported timescales change over the stages of the process for each group. Adoption timescale data appears in Table 7.3 and in Diagrams 7.5 and 7.6 below. The first finding to note is that timescales are similar for both the Control and Treatment groups. For example, the most commonly reported timescale at all stages of the intervention is 12 months (the longest option available for selection in the survey). This is followed, though at some distance, by a timescale of 6 months.

Table 7.3 Timescale to Adoption of Performance Enhancing Technology

Stage	None		Within 3 Months		Within 6 Months		Within 9 Months		Within 12 Months	
	C	T	C	T	C	T	C	T	C	T
B	5%	8%	21%	12%	24%	31%	12%	12%	38%	37%
BP	2%	7%	14%	9%	32%	38%	6%	18%	46%	29%
CTG	3%	0%	17%	14%	26%	34%	20%	3%	34%	49%
GD	8% (+3)	0%	17% (-4)	11%	29%	36%	4%	7%	42%	46%

Diagram 7.5 Timescales to Adoption - Control

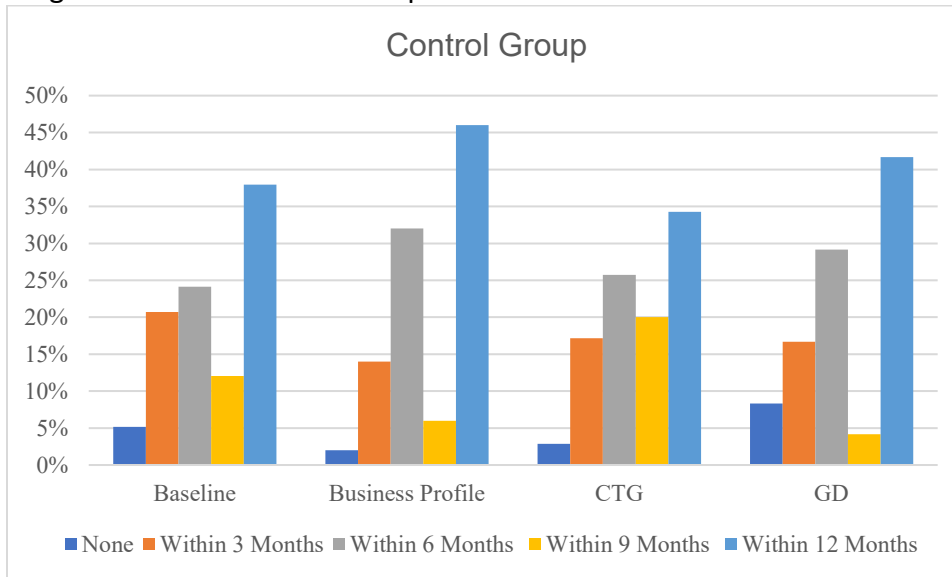
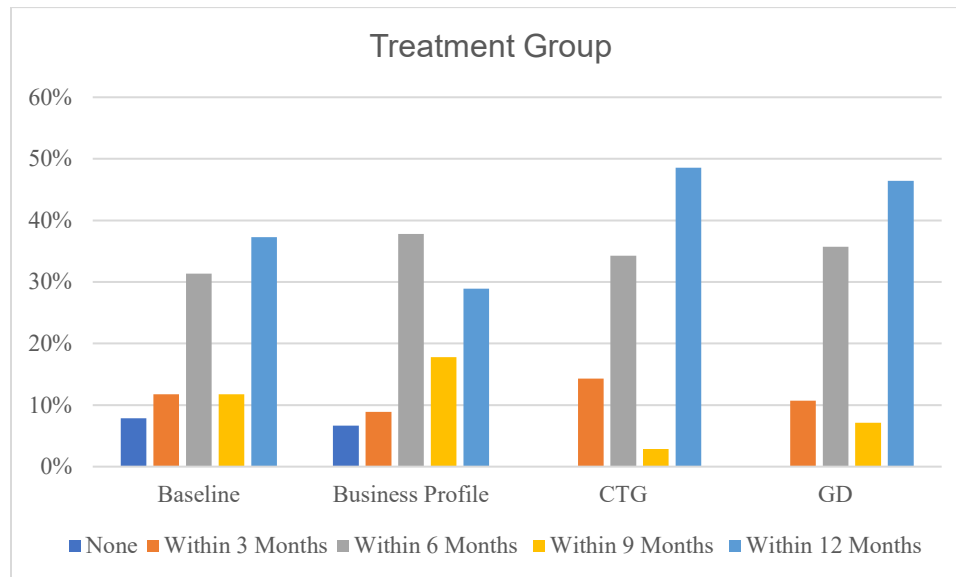


Diagram 7.6 Timescales to Adoption – Treatment



The picture with respect to changes as firms progress through the intervention is a complex one, though further detail is provided in the inferential statistics section at 8.3 below. However, we note here that by CtG stage, none of the T participants indicate ‘no timescale’ for adoption in mind. In comparison, 8% of C participants (an increased number from CtG) report at this stage that no timescale is in play. Whilst numbers are small, we conclude that the T route is more effective in convincing its participants to move towards a consideration of an adoption timeline. We also note that for the T group, there appears to be some compression at GD stage: whilst the three month and 12 month predictions to adoption are slightly reduced, the 6 and 9 month timings increase. For the C group, we see an increase at both extremes at GD: as noted above ‘no timescale’ and 12 month predictions increase fairly substantially.

### 7.1.6 Progression

At the Baseline stage, we have a sample of 109 registered participant companies: 58 of these were allocated to the Control group, and 51 to the Treatment group. Of the 109 companies initially registered, 95 progressed to the BP stage (50 Control and 45 Treatment). At the CtG stage, the sample size was 71 (36 Control and 35 Treatment), and at the final GD stage, the sample had reduced to 55 (26 Control and 29 Treatment).

In percentage terms, 87% of initially registered participants progressed to the BP stage. Further progression from BP to CtG was at 65%, and progression from CtG to GD stage was recorded at 50%. Progression rates were higher for the Treatment group than the Control, with 88% of the initial Treatment sample progressing to the BP stage, 69% to the CtG stage, and 57% to the final GD stage. Comparative progression for the Control group was less marked at 86% at BP stage, 62% at CtG stage, and 45% at GD stage.

Table 7.4 Progression Rates: sample size at each stage

Stage	Total Sample	Control	Treatment
Baseline	109	58	51
Business Profile	95 (87%)	50 (86%)	45 (88%)
Connect to Grow	71 (65%)	36 (62%)	35 (69%)
Growth Demonstrator	55 (50%)	26 (45%)	29 (57%)

There is evidence here that those participants in the Treatment group were more likely than their Control counterparts to remain in the programme at each stage of the intervention (see Table 7.4). Based on progression rate observations, it appears that the peer-to-peer delivery mode applied to the Treatment group increases participants' progression in the programme until its later stages or until completion. This relative 'stickiness' of the mode of delivery has further implications that are explored below.

## 7.2 Testing the Effects of Intervention between Control and Treatment Groups (Independent Sample Group Comparison of Means)

(see Appendix 2 for detailed calculation results and test comments)

7.2.1 Primary outcome: comparison of **intention level** between treatment and control groups on business profile, ctg, and gd stage

7.2.1.1 Independent sample t test with equal variances assumed (see Appendix 2 for Levene's Test for Equality of Variances):

- 1) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with bp intervention ( $p = 0.487$ ,  $t = 0.697$ )
- 2) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with ctg intervention ( $p = 0.525$ ,  $t = -0.639$ )
- 3) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with gd intervention ( $p = 0.389$ ,  $t = -0.867$ )

7.2.1.2 Independent sample t test with the bias-corrected and accelerated (BCa) bootstrap (2000 bootstrap samples):

- 1) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' intention variance with bp intervention ( $p = 0.512$ , bias = 0.002)
- 2) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' intention variance with ctg intervention ( $p = 0.513$ , bias = 0.077)
- 3) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' intention variance with gd intervention ( $p = 0.397$ , bias = -0.277)

7.2.2 Secondary outcome one: comparison of **confidence, timescale, and progression level** between treatment and control groups on business profile, ctg, and gd stage

7.2.2.1 **Confidence level** independent sample t test with equal variances assumed (see Appendix 2 for Levene's Test for Equality of Variances):

- 1) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with bp intervention ( $p = 0.281$ ,  $t = 1.085$ )
- 2) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with ctg intervention ( $p = 0.484$ ,  $t = -0.703$ )
- 3) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with gd intervention ( $p = 0.948$ ,  $t = 0.065$ )

7.2.2.2 **Confidence level** independent sample t test with the bias-corrected and accelerated (BCa) bootstrap (2000 bootstrap samples):

- 1) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' confidence variance with bp intervention ( $p = 0.303$ , bias = 1.084)
- 2) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' confidence variance with ctg intervention ( $p = 0.465$ , bias = 0.026)
- 3) **Confidence** Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' confidence variance with gd intervention ( $p = 0.950$ , bias = 0.065)

7.2.2.3 **Timescale** independent sample t test with equal variances assumed (see Appendix 2 for Levene's Test for Equality of Variances):

- 1) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with bp intervention ( $p = 0.375$ ,  $t = 0.509$ )
- 2) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with ctg intervention ( $p = 0.878$ ,  $t = 0.154$ )
- 3) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with gd intervention ( $p = 0.977$ ,  $t = 0.029$ )

7.2.2.4 **Timescale** independent sample t test with the bias-corrected and accelerated (BCa) bootstrap (2000 bootstrap samples):

- 1) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' timescale variance with bp intervention ( $p = 0.504$ , bias = -0.649)
- 2) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' timescale variance with ctg intervention ( $p = 0.884$ , bias = 0.155)
- 3) Independent sample t test with BCa bootstrap: there is no significant difference between treatment and control groups' timescale variance with gd intervention ( $p = 0.979$ , bias = 0.028)

7.2.2.5 **Progression** independent sample t test with equal variances assumed (see Appendix 2 for Levene's Test for Equality of Variances):

- 1) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' progression variance with bp intervention ( $p = 0.353$ ,  $t = -1.200$ )
- 2) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' progression variance with ctg intervention ( $p = 0.206$ ,  $t = -1.508$ )
- 3) Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' progression variance with gd intervention ( $p = 0.783$ ,  $t = -0.288$ )
- 4) Two sample test of proportions: there is no significant difference between the Treatment and Control groups' progression variance from Baseline to GD stage ( $p = 0.210$ , control mean = 0.448, treatment mean = 0.569)

### 7.3 Controlling for Covariates

For primary and secondary research questions linear regressions are employed to control for covariate effects. Although none of the group comparison tests indicate significant difference between the Control and Treatment group, linear regression covariate checks have been carried out to (1) estimate the covariate effect of employee size and turnover; and (2) provide a robustness check for the comparison of group statistics in section 7.2.

7.3.1 Primary outcome: linear regression of **intention level** variance with Independent Variable (IV) treatment and covariates employee size and turnover on business profile, ctg, and gd stage (see Appendix 3 for test result with details)

7.3.1.1 linear regression of **intention level** variance with IV treatment with bp data

IVs	t value	Sig.
treatment	-0.700	0.487

Linear regression result indicates no significant impact from treatment to the intention of adoption with bp data.

7.3.1.2 linear regression of **intention level** variance with IV treatment and covariates employee size and turnover with bp data

IVs	t value	Sig.
treatment	-0.740	0.464
emp_bp	0.400	0.689
Turnover_bp	0.350	0.725

Linear regression result indicates no significant impact from treatment to the intention of adoption and control factors employee size and turnover have no significant impact on the intention of adoption with bp data.

### 7.3.1.3 linear regression of **intention level** variance with IV treatment with ctg data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	0.640	0.525

Linear regression result indicates no significant impact from treatment to the intention of adoption with ctg data.

### 7.3.1.4 linear regression of **intention level** variance with IV treatment and covariates employee size and turnover with ctg data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	0.620	0.539
<b>emp_ctg</b>	0.950	0.345
<b>Turnover_ctg</b>	-0.870	0.386

Linear regression result indicates no significant impact from treatment to the intention of adoption and control factors employee size and turnover have no significant impact on the intention of adoption with ctg data.

### 7.3.1.5 linear regression of **intention level** variance with IV treatment with gd data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	0.870	0.390

Linear regression result indicates no significant impact from treatment to the intention of adoption with gd data.

### 7.3.1.6 linear regression of **intention level** variance with IV treatment and covariates employee size and turnover with gd data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	0.800	0.426
<b>emp_gd</b>	1.000	0.321
<b>Turnover_gd</b>	-0.500	0.617

Linear regression result indicates no significant impact from treatment to the intention of adoption and control factors employee size and turnover have no significant impact on the intention of adoption with gd data.

## 7.3.2 Secondary outcome: linear regression of **confidence level** variance with IV treatment and covariates employee size and turnover on business profile, ctg, and gd stage

### 7.3.2.1 linear regression of **confidence level** variance with IV treatment with bp data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	-1.080	0.281



Linear regression result indicates no significant impact from treatment to the confidence of adoption with bp data.

7.3.2.2 linear regression of **confidence level** variance with IV treatment and covariates employee size and turnover with bp data

IVs	t value	Sig.
treatment	-1.12	0.265
emp_bp	-0.370	0.714
Turnover_bp	0.780	0.437

Linear regression result indicates no significant impact from treatment to the confidence of adoption and control factors employee size and turnover have no significant impact on the confidence of adoption with bp data.

7.3.2.3 linear regression of **confidence level** variance with IV treatment with ctg data

IVs	t value	Sig.
treatment	0.700	0.484

Linear regression result indicates no significant impact from treatment to the confidence of adoption with ctg data.

7.3.2.4 linear regression of **confidence level** variance with IV treatment and covariates employee size and turnover with ctg data

IVs	t value	Sig.
treatment	0.700	0.485
emp_ctg	0.920	0.363
Turnover_ctg	-0.940	0.350

Linear regression result indicates no significant impact from treatment to the confidence of adoption and control factors employee size and turnover have no significant impact on the confidence of adoption with ctg data.

7.3.2.5 linear regression of **confidence level** variance with IV treatment with gd data

IVs	t value	Sig.
treatment	-0.060	0.948

Linear regression result indicates no significant impact from treatment to the confidence of adoption with gd data.

7.3.2.6 linear regression of **confidence level** variance with IV treatment and covariates employee size and turnover with gd data

IVs	t value	Sig.
treatment	-0.060	0.950
emp_gd	0.510	0.610

<b>Turnover_gd</b>	-0.480	0.630
--------------------	--------	-------

Linear regression result indicates no significant impact from treatment to the confidence of adoption and control factors employee size and turnover have no significant impact on the confidence of adoption with gd data.

7.3.3 Secondary outcome: linear regression of **timescale** variance with IV treatment and covariates employee size and turnover on business profile, ctg, and gd stage

7.3.3.1 linear regression of **timescale** variance with IV treatment with bp data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	0.660	0.509

Linear regression result indicates no significant impact from treatment to the timescale of adoption with bp data.

7.3.3.2 linear regression of **timescale** variance with IV treatment and covariates employee size and turnover with bp data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	0.770	0.442
<b>emp_bp</b>	2.590	0.011
<b>Turnover_bp</b>	-2.470	0.015

Linear regression result indicates no significant impact from treatment to the timescale of adoption. However control factors employee size and turnover have significant impacts on the timescale of adoption with bp data. In this case larger firms has longer timescale of adoption and higher turnover reduce the timescale.

7.3.3.3 linear regression of **timescale** variance with IV treatment with ctg data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	-0.150	0.878

Linear regression result indicates no significant impact from treatment to the timescale of adoption with ctg data.

7.3.3.4 linear regression of **timescale** variance with IV treatment and covariates employee size and turnover with ctg data

<b>IVs</b>	<b>t value</b>	<b>Sig.</b>
<b>treatment</b>	-0.010	0.992
<b>emp_ctg</b>	1.460	0.150
<b>Turnover_ctg</b>	-2.180	0.033

The linear regression result indicates no significant impact from Treatment to the timescale of adoption, and the control factor employee size has no significant impact on timescale for adoption from ctg data. Higher turnover however, reduces the adoption timescale with ctg data.

### 7.3.3.5 linear regression of **timescale** variance with IV treatment with gd data

IVs	t value	Sig.
<b>treatment</b>	-0.030	0.977

The linear regression result indicates no significant impact from Treatment to the timescale of adoption with gd data.

### 7.3.3.6 linear regression of **timescale** variance with IV Treatment and covariates employee size and turnover with gd data

IVs	t value	Sig.
<b>treatment</b>	-0.030	0.978
<b>emp_gd</b>	0.030	0.980
<b>Turnover_gd</b>	-0.030	0.974

The linear regression result indicates no significant impact from Treatment to the timescale of adoption and control factors employee size and turnover have no significant impact on the timescale of adoption with gd data.

## 8. SUPPLEMENTARY ANALYSIS

The MCL project unveils unique patterns and allows us to learn more with respect to the planning, design, and testing of randomised controlled trials that involve intervention in real-world business settings. Among many outcomes, the model effectiveness of the group comparison between Treatment and Control has not been potent. As a result, there is a compelling case for the confirmation of the variance of the primary and secondary outcomes in terms of overall variance through the intervention.

A panel linear regression model with stages (e.g., baseline, business profile, ctg, and gd) as longitudinal IV reviews the variances within the trial of all participating businesses. The findings allow us to analyse the effect of the intervention on technology adoption without contrasting peer-to-peer and self-administrated learning modes.

8.1 Longitudinal GLS linear regression of 'intention' over stages (see Appendix 4 for test result with details)

DV	Coef.	Sig.
<b>intention</b>		
<b>IV</b>		
<b>stage</b>	-2.018	0.022
<b>_cons</b>	81.326	0.000

8.2 Longitudinal GLS linear regression of 'confidence' over stages (see Appendix 4 for test result with details)

DV	Coef.	Sig.
<b>confidence</b>		
<b>IV</b>		
<b>stage</b>	1.906	0.068
<b>_cons</b>	58.735	0.000

### 8.3 Longitudinal GLS linear regression of ‘timescale’ over stages (see Appendix 4 for test result with details)

DV	Coef.	Sig.
<b>intention</b>		
<b>IV</b>		
<b>stage</b>	-0.607	0.017
<b>_cons</b>	10.584	0.000

The ‘intention to adopt’ of participating businesses was found to have declined at the close of the intervention. One explanation for this is the Kruger effect, when cognitive bias leads to overoptimistic assessment of capabilities, and it is possible that perspectives/cognition might have been adjusted following the acquisition enhanced technology adoption knowledge and capabilities (Dunning and Kruger, 1999). Unlike the ‘intention’ score, confidence levels increased significantly over the course of the intervention. This echoes the argument that, although intention has receded, confidence with respect to capacity to engage with appropriate supports in the technology adoption and implementation process has been enhanced. Longitudinal analysis of the timescale over the stages of intervention also demonstrates that there is significant reduction in the adoption timeline. This could be a result of the interventions capacity to boost participant companies with new capabilities that facilitate earlier adoption and implementation of relevant technologies.

### 8.4 Participation and Additional Outcome Measures of Final Interview

All 109 registered companies were invited to take part in the final interview and 53 agreed to participate. Throughout the interviews, data was collected with respect to ‘intention to adopt’ new technologies and participant’s satisfaction with the intervention experience. Descriptive statistics in relation to the scores are reported in Table 8.4.1. The score of intention to adopt uses a Likert scale of 1 to 5 where 1 indicates no intention and 5 indicates the highest level of intention. Satisfaction scores are coded as follows: 1 = negative, 2 = ambivalent/equivocal, and 3 = positive. More detailed analysis of the final interviews can be found in qualitative sections of this report.

Table 8.4.1 Baseline characteristics of participating businesses in final interview

Variables	Obs.	Mean	Std. Dev.	Min	Max
Intention_participating	50	3.560	1.417	1.000	5.000
Satisfaction_participating	52	2.615	0.631	1.000	3.000
Turnover_participating	53	3481154.491	5652977.199	0.000	30000000.000
Employee size_participating	53	26.189	31.685	1.000	180.000

To investigate the effects of baseline characteristics, e.g. turnover and employee size, and T/C assignment on participation in the final interviews, a series of independent sample t tests (with equal variances assumed) have been run. The test results are reported in table 8.4.2.

Table 8.4.2 Bias test of the participating and non-participating businesses of the final interview

Test	Coefficient	P value

Baseline Characteristics' comparison between participating and non-participating businesses	Turnover comparison between participating and non-participating businesses independent sample t test	-0.524	0.602
	Employee size comparison between participating and non-participating businesses independent sample t test	-0.950	0.344
Treatment assignment comparison between participating and non-participating businesses	Treatment assignment comparison between participating and non-participating businesses chi-square test	1.512	0.219
Baseline Characteristics' comparison between treatment and control businesses that participated in final interview	Turnover comparison between treatment and control businesses that participated in final interview	-0.296	0.769
	Employee size comparison between treatment and control businesses that participated in final interview	-0.316	0.753

From the above test results we conclude that participation in final interviews is not biased by firm turnover over and employee size. Also, assignment to Treatment or Control also does not impact on whether businesses opt in or out of the final interview programme (see Appendix 5 for test details). Among those participating in the final interview, there is no significant difference in baseline characteristics, e.g. turnover and employee size, between Treatment and Control firms.

In addition, we investigate differences between Control and Treatment participants' progression to the final interview from the baseline stage. This is achieved by the following two sample tests of proportions.

Treatment assignment's effect on participation in final interview:

Treatment assignment	Count no. at baseline stage	Count no. at final interview
Treatment group	51	28
Control group	58	25

Two sample proportional test on the effect of treatment assignment on participation in the final interview: there is no significant difference between treatment and control groups' progression variance from baseline to final interview ( $p = 0.219$ , control mean = 0.431, treatment mean = 0.549)

Further, we investigate the effect of progression in the intervention on participation in the final interview. This is done by the following two sample test of proportions. In this case we consider those firms that proceed at least to the CtG stage of the project.

Intervention effect on participation in final interview:

Intervention assignment	Count no. at baseline stage	Count no. at final interview
Participated in CtG and/or further stages	71	48
Did not participate in CtG stage	38	5

Two sample proportional test on intervention effect on participation in the final interview: there is a significant difference in terms of progression to final interview between those businesses that participated at CtG and beyond and those that did not advance as far as CtG ( $p = 0.000$ , non-participate mean = 0.132, ctg participate mean = 0.676).

## Reference

Dunning, D., and Kruger, J. (1999) Unskilled and Unaware of It: How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-Assessments, *Journal of Personality and Social Psychology*, 77(6): 1121-1134

## Appendix

### Appendix 1 Balance check calculation

Null Hypothesis:

$$\beta_4 = \beta_5 =$$

With F-test:

$$F_{q,n-k-1} = \frac{(SSR_R - SSR_u)/(df_R - df_u)}{SSR_R/(n - k - 1)}$$

SSR = sum of square residuals, restricted and unrestricted

q = number of restrictions (here, the number of variables set equal to zero)

N = population size

k = number of variables in the regression, including the constant

$$F_{q,n-k-1} = \frac{(SSR_R - SSR_u)/(df_R - df_u)}{SSR_R/(n - k - 1)}$$

$$F_{2,109-5-1} = \frac{\frac{26.3912-26.1713}{105-103}}{\frac{26.1713}{109-5-1}}$$

$$= 0.4327$$

$F_{2,120}$  (at  $\alpha = 0.10$ ) = 2.3473, confirm the insignificance of the two restrictions  $\beta_4 EmployeeSize_i$  and  $\beta_5 Turnover_i$

F-test for joint significance with Employee size and Turnover on Business Profile

$$F_{q,n-k-1} = \frac{(SSR_R - SSR_u)/(df_R - df_u)}{SSR_R/(n - k - 1)}$$

$$F_{2,95-5-1} = \frac{\frac{23.3141-23.2028}{91-89}}{\frac{23.3141}{95-5-1}}$$

$$= 0.2124$$

$F_{2,120}$  (at  $\alpha = 0.10$ ) = 2.3473, confirm the insignificance of the two restrictions  $\beta_4 EmployeeSize_i$  and  $\beta_5 Turnover_i$





**Appendix 2** Independent sample two group comparison of means

3.1 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with ctg intervention

**Group Statistics**

		Bootstrap <sup>a</sup>				
		Statistic	Bias	Std. Error	95% Confidence Interval	
treatment					Lower	Upper
ctg4.4intention	0	N	36			
		Mean	74.72	-.23	4.31	65.72 82.70
		Std. Deviation	25.910	-.645	4.317	16.174 33.311
		Std. Error Mean	4.318			
	1	N	35			
		Mean	78.00	.01	2.66	72.43 82.97
		Std. Deviation	16.051	-.375	2.263	11.369 20.276
		Std. Error Mean	2.713			

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

**Independent Samples Test**

Levene's Test for Equality of Variances	t-test for Equality of Means
---	------------------------------

			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
ctg4.4intention	Equal variances assumed		3.739	.057	-.639	69	.525	-3.278	5.133	-13.517	6.961
	Equal variances not assumed				-.643	58.674	.523	-3.278	5.100	-13.484	6.928

Bootstrap with 2000 samples

**Bootstrap for Independent Samples Test**

				Bootstrap <sup>a</sup>					
				Mean Difference			BCa 95% Confidence Interval		
					Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
ctg4.4intention	Equal variances assumed			-3.278	.077	4.959	.513	-14.231	6.609
	Equal variances not assumed			-3.278	.077	4.959	.515	-14.231	6.609

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

3.2 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with gd intervention

**Group Statistics**

	Statistic	Bootstrap <sup>a</sup>			
		Bias	Std. Error	BCa 95% Confidence Interval	
treatment				Lower	Upper

gd5.4.4intention 0	N	26				
	Mean	70.38	-.06	5.41	58.70	80.42
	Std. Deviation	27.926	-.920	4.788	18.977	34.196
	Std. Error Mean	5.477				
1	N	29				
	Mean	76.55	.22	4.41	66.28	85.68
	Std. Deviation	24.825	-1.014	4.400	17.027	30.285
	Std. Error Mean	4.610				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
gd5.4.4intention	Equal variances assumed	.216	.644	-.867	53	.390	-6.167	7.112	-20.432	8.098
	Equal variances not assumed			-.862	50.390	.393	-6.167	7.159	-20.543	8.208

### Bootstrap for Independent Samples Test

			Bootstrap <sup>a</sup>		Sig. (2-tailed)	BCa 95% Confidence Interval	
Mean Difference			Bias	Std. Error		Lower	Upper
gd5.4.intention	Equal variances assumed	-6.167	-.277	7.050	.397	-19.900	6.640
	Equal variances not assumed	-6.167	-.277	7.050	.403	-19.900	6.640

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

3.3 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with bp intervention ( $p = 0.487$ ,  $t = 0.697$ )

#### Group Statistics

			Bootstrap <sup>a</sup>		BCa 95% Confidence Interval		
treatment			Statistic	Bias	Std. Error	Lower	Upper
bp3.4.intention	0	N	50				
		Mean	79.20	.08	2.76	73.51	84.68
		Std. Deviation	18.935	-.297	2.142	15.060	22.178
		Std. Error Mean	2.678				
	1	N	45				
		Mean	76.44	.08	2.88	70.81	82.22
		Std. Deviation	19.558	-.356	2.203	15.476	22.925
		Std. Error Mean	2.916				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
bp3.4intention	Equal variances assumed	.022	.882	.697	93	.487	2.756	3.952	-5.092	10.603
	Equal variances not assumed			.696	91.241	.488	2.756	3.959	-5.108	10.619

### Bootstrap for Independent Samples Test

		Bootstrap <sup>a</sup>					
		Mean Difference	Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
						Lower	Upper
bp3.4intention	Equal variances assumed	2.756	.002	3.951	.512	-5.182	10.068
	Equal variances not assumed	2.756	.002	3.951	.511	-5.182	10.068

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

4. Secondary comparison of confidence, timescale, and progression between treatment and control groups

4.1 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with ctg intervention (p = 0.4842, t= -0.7034)

### Group Statistics

			Bootstrap <sup>a</sup>				
			Bias	Std. Error	BCa 95% Confidence Interval		
	treatment	Statistic			Lower	Upper	
ctg4.3confidence	0	N	36				
		Mean	63.33	.09	4.24	54.38	71.62
		Std. Deviation	26.186	-.584	3.422	19.130	30.984
		Std. Error Mean	4.364				
	1	N	35				
		Mean	67.14	.06	3.13	60.59	73.44
		Std. Deviation	18.720	-.428	2.677	14.136	22.408
		Std. Error Mean	3.164				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

		Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	Lower	Upper
ctg4.3confidence	Equal variances assumed	2.975	.089	-.703	69	.484	-3.810	5.416	-14.614	6.994	
	Equal variances not assumed			-.707	63.425	.482	-3.810	5.391	-14.581	6.962	

**Bootstrap for Independent Samples Test**

		Mean Difference	Bootstrap <sup>a</sup>			BCa 95% Confidence Interval	
			Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
ctg4.3confidence	Equal variances assumed	-3.810	.026	5.255	.465	-14.045	5.953
	Equal variances not assumed	-3.810	.026	5.255	.464	-14.045	5.953

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

4.3 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with gd intervention (p = 0.9485, t= 0.0649)

**Group Statistics**

		Statistic	Bootstrap <sup>a</sup>			BCa 95% Confidence Interval	
treatment			Bias	Std. Error	Lower	Upper	
gd5.4.3confidence	0	N	26				
		Mean	67.69	-.19	5.06	56.90	76.67
		Std. Deviation	26.124	-.900	4.704	16.578	32.631
		Std. Error Mean	5.123				
	1	N	29				
		Mean	67.24	-.08	4.63	57.20	76.25
		Std. Deviation	25.340	-.729	3.691	18.509	30.158

Std. Error Mean	4.706				
-----------------	-------	--	--	--	--

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Interval Difference Lower	Confidence of the Upper
gd5.4.3confidence	Equal variances assumed	.034	.855	.065	53	.948	.451	6.945	-13.478	14.380
	Equal variances not assumed			.065	51.957	.949	.451	6.956	-13.508	14.410

Stata for bootstrap:

**. bootstrap t=r(t), rep(2000): ttest ctg43confidence, by( treatment) unequal**

**. bootstrap t=r(t), rep(2000): ttest gd543confidence, by( treatment) unequal**

```

-----
      | Observed Bootstrap          Normal-based
      | Coef. Std. Err.  z  P>|z|  [95% Conf. Interval]
-----+-----
      t | .0648227  1.030879  0.06  0.950  -1.955662  2.085308
-----

```



4.6 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with bp intervention ( $p = 0.281$ ,  $t = 1.085$ )

**Group Statistics**

				Bootstrap <sup>a</sup>			
				Bias	Std. Error	BCa 95% Confidence Interval	
		treatment	Statistic			Lower	Upper
bp3.3confidence	0	N	50				
		Mean	63.00	-.03	3.38	56.22	69.42
		Std. Deviation	23.321	-.404	2.416	18.901	26.757
		Std. Error Mean	3.298				
	1	N	45				
		Mean	57.78	-.10	3.45	51.06	64.20
		Std. Deviation	23.538	-.348	1.998	19.946	26.362
		Std. Error Mean	3.509				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

**Independent Samples Test**

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper

bp3.3confidence	Equal variances assumed	.009	.923	1.085	93	.281	5.222	4.813	-4.336	14.780
	Equal variances not assumed			1.084	91.770	.281	5.222	4.816	-4.342	14.787

### Bootstrap for Independent Samples Test

		Mean Difference	Bootstrap <sup>a</sup>		BCa 95% Confidence Interval	
			Bias	Std. Error	Lower	Upper
bp3.3confidence	Equal variances assumed	5.222	.065	4.828	-4.317	15.052
	Equal variances not assumed	5.222	.065	4.828	-4.317	15.052

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

**. bootstrap t=r(t), rep(2000): ttest bp33confidence, by( treatment) unequal**

```

-----
| Observed Bootstrap          Normal-based
| Coef. Std. Err.  z  P>|z|  [95% Conf. Interval]
-----+-----
t | 1.084449  1.05356  1.03  0.303  -1.9804908  3.149389
-----

```

4.2 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with ctg intervention ( $p = 0.8781$ ,  $t = -0.1540$ )

### Group Statistics

			Bootstrap <sup>a</sup>				
			BCa 95% Confidence Interval				
	treatment	Statistic	Bias	Std. Error	Lower	Upper	
ctg4.5time	0	N	36				
		Mean	8.75	.00	.98	7.14	10.68
		Std. Deviation	5.886	-.340	1.764	3.229	8.638
		Std. Error Mean	.981				
	1	N	35				
		Mean	8.57	.01	.60	7.30	9.79
		Std. Deviation	3.575	-.060	.210	3.240	3.787
		Std. Error Mean	.604				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	Lower	Upper
ctg4.5time	Equal variances assumed	.296	.588	.154	69	.878	.179	1.160	-2.135	2.492	
	Equal variances not assumed			.155	58.002	.877	.179	1.152	-2.128	2.485	

**Bootstrap for Independent Samples Test**

		Mean Difference	Bootstrap <sup>a</sup>		BCa 95% Confidence Interval	
			Bias	Std. Error	Lower	Upper
ctg4.5time	Equal variances assumed	.179	-.014	1.159	-1.817	2.543
	Equal variances not assumed	.179	-.014	1.159	-1.817	2.543

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

**. bootstrap t=r(t), rep(2000): ttest ctg45time, by( treatment) unequal**

```

-----
      | Observed Bootstrap           Normal-based
      | Coef. Std. Err.  z  P>|z|  [95% Conf. Interval]
-----+-----
      t | .1549759  1.058474  0.15  0.884  -1.919595  2.229547
-----
  
```

4.4 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with gd intervention (p = 0.9769, t= 0.0291)

**Group Statistics**

		Statistic	Bootstrap <sup>a</sup>		BCa 95% Confidence Interval	
			Bias	Std. Error	Lower	Upper
gd5.4.5time	0	N	26			
		Mean	8.42	-.06	1.35	6.28 10.96

1	Std. Deviation	7.100	-.520	2.048	3.926	9.812
	Std. Error Mean	1.392				
	N	29				
	Mean	8.38	.01	.69	7.04	9.68
	Std. Deviation	3.707	-.080	.347	3.114	4.155
	Std. Error Mean	.688				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

			Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
gd5.4.5ti me	Equal variances assumed		2.629	.111	.029	53	.977	.044	1.505	-2.974	3.062
	Equal variances not assumed				.028	36.754	.978	.044	1.553	-3.104	3.192

### Bootstrap for Independent Samples Test

Mean Difference	Bootstrap <sup>a</sup>		BCa 95% Confidence Interval	
	Bias	Std. Error	Lower	Upper

gd5.4.5time	Equal variances assumed	.044		-.069	1.503	-2.500	2.827
	Equal variances not assumed	.044		-.069	1.503	-2.500	2.827

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

**. bootstrap t=r(t), rep(2000): ttest gd545time, by( treatment) unequal**

```

-----
      | Observed Bootstrap           Normal-based
      | Coef. Std. Err.  z  P>|z|  [95% Conf. Interval]
-----+-----
      t | .0281755  1.064452  0.03  0.979  -2.058111  2.114462
-----

```

4.7 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with bp intervention (p = 0.509, t= -0.662)

**Group Statistics**

			Bootstrap <sup>a</sup>				
treatment			Statistic	Bias	Std. Error	BCa 95% Confidence Interval	
						Lower	Upper
bp3.5time	0	N	50				
		Mean	9.12	-.01	.73	7.87	10.56
		Std. Deviation	5.212	-.216	1.337	3.275	7.357
		Std. Error Mean	.737				
1	N	45					
	Mean	10.00	.00	1.14	8.13	12.23	

Std. Deviation	7.622	-.314	1.773	3.244	10.108
Std. Error Mean	1.136				

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
bp3.5time	Equal variances assumed	.795	.375	-.662	93	.509	-.880	1.328	-3.518	1.758
	Equal variances not assumed			-.650	76.644	.518	-.880	1.354	-3.577	1.817

### Bootstrap for Independent Samples Test

		Mean Difference	Bootstrap <sup>a</sup>		BCa 95% Confidence Interval	
			Bias	Std. Error	Lower	Upper
bp3.5time	Equal variances assumed	-.880	-.007	1.358	-3.791	1.766
	Equal variances not assumed	-.880	-.007	1.358	-3.791	1.766

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

**. bootstrap t=r(t), rep(2000): ttest bp35time, by( treatment) unequal**

```

-----
      | Observed Bootstrap          Normal-based
      |   Coef. Std. Err.   z   P>|z|   [95% Conf. Interval]
-----+-----
      | t | -.6497538   .9720021  -0.67  0.504  -2.554843   1.255335
-----
  
```

4.5 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' progression variance with ctg and gd intervention (p = 0.783, t= -0.288)

4.8 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' progression variance with bp intervention (p = 0.353, t= -1.200)

51.00	1.00
45.00	1.00
58.00	.00
50.00	.00

**Independent Samples Test**

Levene's Test for Equality of Variances | t-test for Equality of Means



			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Interval Difference Lower	Confidence of the Upper
VAR000 01	Equal variances assumed	.	.	-1.200	2	.353	-6.00000	5.00000	-27.51326	15.51326	
	Equal variances not assumed			-1.200	1.855	.361	-6.00000	5.00000	-29.21321	17.21321	

### Progression Tests

Obs.	Treatment
51	1
45	1
35	1
29	1
58	0
50	0
36	0
26	0

### Independent Samples Test

Levene's Test for Equality of Variances | t-test for Equality of Means

			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Interval Difference Lower	Confidence of the Upper
VAR00001	Equal variances assumed		1.246	.307	-.288	6	.783	-2.500	8.675	-23.726	18.726
	Equal variances not assumed				-.288	5.334	.784	-2.500	8.675	-24.385	19.385

6.00	1.00
10.00	1.00
6.00	1.00
8.00	.00
14.00	.00
10.00	.00

### Independent Samples Test

			Levene's Test for Equality of Variances		t-test for Equality of Means						
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Interval Difference Lower	Confidence of the Upper
VAR00003	Equal variances assumed		.235	.653	-1.508	4	.206	-3.33333	2.21108	-9.47228	2.80562

Equal variances not assumed				-1.508	3.723	.211	-3.33333	2.21108	-9.65663	2.98996
-----------------------------	--	--	--	--------	-------	------	----------	---------	----------	---------

Progression	Treatment
51	1.00
29	1.00
58	0.00
26	0.00

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Progression	Equal variances assumed	.	.	-.103	2	.927	-2.00000	19.41649	-85.54240	81.54240
	Equal variances not assumed			-.103	1.773	.928	-2.00000	19.41649	-96.69659	92.69659

Updated two sample proportional test:

Two-sample test of proportions

x: Number of obs = 58  
 y: Number of obs = 51

Variable	Mean	Std. Err.	z	P> z	[95% Conf. Interval]
x	.4482759	.065301			.3202883 .5762634
y	.5686275	.0693514			.4327013 .7045536
diff	-.1203516	.0952567			-.3070512 .066348
	under Ho:	.0959767	-1.25	0.210	

diff = prop(x) - prop(y) z = -1.2540  
 Ho: diff = 0

Ha: diff < 0                      Ha: diff != 0                      Ha: diff > 0  
 Pr(Z < z) = 0.1049                  Pr(|Z| < |z|) = 0.2099                  Pr(Z > z) = 0.8951

### Appendix 3 Controlling for Covariates

Primary comparison of **intention level** between treatment and control groups on ctg stage and gd stage

Results:

3.1 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with ctg intervention (p = 0.525, t= -0.639)

**reg ctg44intention treatment**

```
. reg ctg44intention treatment
```

Source	SS	df	MS	Number of obs =	71
Model	190.665102	1	190.665102	F( 1, 69) =	0.41
Residual	32257.2222	69	467.495974	Prob > F =	0.5252
Total	32447.8873	70	463.541247	R-squared =	0.0059
				Adj R-squared =	-0.0085
				Root MSE =	21.622

ctg44inten~n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	3.277778	5.132546	0.64	0.525	-6.961371 13.51693
_cons	74.72222	3.603609	20.74	0.000	67.53322 81.91123

```
reg ctg44intention treatment emp_ctg turnover_ctg
```

Source	SS	df	MS	Number of obs =	71
Model	628.710829	3	209.570276	F( 3, 67) =	0.44
Residual	31819.1765	67	474.913082	Prob > F =	0.7242
Total	32447.8873	70	463.541247	R-squared =	0.0194
				Adj R-squared =	-0.0245
				Root MSE =	21.793

ctg44inten~n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	3.214108	5.203867	0.62	0.539	-7.172855 13.60107
emp_ctg	.1375465	.1445705	0.95	0.345	-.1510174 .4261104
turnover_ctg	-6.99e-07	8.01e-07	-0.87	0.386	-2.30e-06 8.99e-07
_cons	73.33006	4.284001	17.12	0.000	64.77915 81.88096

3.2 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with gd intervention ( $p = 0.389$ ,  $t = -0.867$ )

**reg gd544intention treatment**

Source	SS	df	MS			
Model	521.401013	1	521.401013	Number of obs =	55	
Residual	36751.3263	53	693.42125	F( 1, 53) =	0.75	
Total	37272.7273	54	690.23569	Prob > F =	0.3898	
				R-squared =	0.0140	
				Adj R-squared =	-0.0046	
				Root MSE =	26.333	

gd544inten~n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treatment	6.167109	7.112041	0.87	0.390	-8.097839	20.43206
_cons	70.38462	5.164305	13.63	0.000	60.02633	80.7429

**reg gd544intention treatment emp\_gd turnover\_gd**

Source	SS	df	MS			
Model	1584.31234	3	528.104113	Number of obs =	55	
Residual	35688.4149	51	699.772842	F( 3, 51) =	0.75	
Total	37272.7273	54	690.23569	Prob > F =	0.5248	
				R-squared =	0.0425	
				Adj R-squared =	-0.0138	
				Root MSE =	26.453	

gd544inten~n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treatment	5.751424	7.161202	0.80	0.426	-8.625289	20.12814
emp_gd	.2322561	.2316079	1.00	0.321	-.2327162	.6972283
turnover_gd	-6.47e-07	1.29e-06	-0.50	0.617	-3.23e-06	1.93e-06
_cons	66.52685	6.076127	10.95	0.000	54.32851	78.72518

3.3 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' intention variance with bp intervention (p = 0.487, t = 0.697)

**reg bp34intention treatment**

. reg bp34intention treatment

Source	SS	df	MS	Number of obs =	95
Model	179.836257	1	179.836257	F( 1, 93) =	0.49
Residual	34399.1111	93	369.882915	Prob > F =	0.4874
Total	34578.9474	94	367.861142	R-squared =	0.0052
				Adj R-squared =	-0.0055
				Root MSE =	19.232

bp34intent~n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-2.755556	3.95187	-0.70	0.487	-10.60319 5.092076
_cons	79.2	2.719864	29.12	0.000	73.79889 84.60111

**reg bp34intention treatment emp\_bp turnover\_bp**

Source	SS	df	MS	Number of obs =	95
Model	1031.22984	3	343.743281	F( 3, 91) =	0.93
Residual	33547.7175	91	368.656237	Prob > F =	0.4284
Total	34578.9474	94	367.861142	R-squared =	0.0298
				Adj R-squared =	-0.0022
				Root MSE =	19.2

bp34intent~n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-2.905932	3.949511	-0.74	0.464	-10.75115 4.939286
emp_bp	.0457294	.114047	0.40	0.689	-.1808109 .2722697
turnover_bp	2.38e-07	6.73e-07	0.35	0.725	-1.10e-06 1.57e-06
_cons	76.8658	3.240878	23.72	0.000	70.4282 83.30341

#### 4. Secondary comparison of confidence, timescale, and progression between treatment and control groups

4.1 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with ctg intervention ( $p = 0.4842$ ,  $t = -0.7034$ )

##### reg ctg43confidence treatment

Source	SS	df	MS	Number of obs =	71
Model	257.545272	1	257.545272	F( 1, 69) =	0.49
Residual	35914.2857	69	520.496894	Prob > F =	0.4842
Total	36171.831	70	516.740443	R-squared =	0.0071
				Adj R-squared =	-0.0073
				Root MSE =	22.814

ctg43confi~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	3.809524	5.41568	0.70	0.484	-6.994462 14.61351
_cons	63.33333	3.8024	16.66	0.000	55.74775 70.91891

##### reg ctg43confidence treatment emp\_ctg turnover\_ctg

. reg ctg43confidence treatment emp\_ctg turnover\_ctg

Source	SS	df	MS	Number of obs =	71
Model	752.782525	3	250.927508	F( 3, 67) =	0.47
Residual	35419.0485	67	528.642514	Prob > F =	0.7010
Total	36171.831	70	516.740443	R-squared =	0.0208
				Adj R-squared =	-0.0230
				Root MSE =	22.992

ctg43confi~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	3.853049	5.490352	0.70	0.485	-7.10574 14.81184
emp_ctg	.1396651	.1525294	0.92	0.363	-.1647849 .4441151
turnover_ctg	-7.95e-07	8.45e-07	-0.94	0.350	-2.48e-06 8.91e-07
_cons	62.22337	4.519845	13.77	0.000	53.20172 71.24501



4.2 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with ctg intervention ( $p = 0.8781$ ,  $t = -0.1540$ )

**reg ctg45time treatment**

Source	SS	df	MS			
Model	.565895372	1	.565895372	Number of obs =	71	
Residual	1647.32143	69	23.8742236	F( 1, 69) =	0.02	
Total	1647.88732	70	23.5412475	Prob > F =	0.8781	
				R-squared =	0.0003	
				Adj R-squared =	-0.0141	
				Root MSE =	4.8861	

ctg45time	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treatment	-.1785714	1.159868	-0.15	0.878	-2.492445	2.135302
_cons	8.75	.8143543	10.74	0.000	7.125408	10.37459

**reg ctg45time treatment emp\_ctg turnover\_ctg**

. reg ctg45time treatment emp\_ctg turnover\_ctg

Source	SS	df	MS			
Model	120.463561	3	40.1545204	Number of obs =	71	
Residual	1527.42376	67	22.7973696	F( 3, 67) =	1.76	
Total	1647.88732	70	23.5412475	Prob > F =	0.1630	
				R-squared =	0.0731	
				Adj R-squared =	0.0316	
				Root MSE =	4.7747	

ctg45time	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treatment	-.0118036	1.140149	-0.01	0.992	-2.28755	2.263943
emp_ctg	.0461506	.0316749	1.46	0.150	-.0170727	.1093739
turnover_ctg	-3.83e-07	1.75e-07	-2.18	0.033	-7.33e-07	-3.23e-08
_cons	8.810959	.9386094	9.39	0.000	6.937487	10.68443

4.3 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with gd intervention (p = 0.9485, t= 0.0649)

**reg gd543confidence treatment**

Source	SS	df	MS	Number of obs =	55
Model	2.78755727	1	2.78755727	F( 1, 53) =	0.00
Residual	35040.8488	53	661.148091	Prob > F =	0.9485
Total	35043.6364	54	648.956229	R-squared =	0.0001
				Adj R-squared =	-0.0188
				Root MSE =	25.713

gd543confi~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-.4509284	6.944565	-0.06	0.948	-14.37996 13.47811
_cons	67.69231	5.042695	13.42	0.000	57.57794 77.80667

**reg gd543confidence treatment emp\_gd turnover\_gd**

Source	SS	df	MS	Number of obs =	55
Model	187.129012	3	62.3763374	F( 3, 51) =	0.09
Residual	34856.5074	51	683.460928	Prob > F =	0.9645
Total	35043.6364	54	648.956229	R-squared =	0.0053
				Adj R-squared =	-0.0532
				Root MSE =	26.143

gd543confi~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-.4464713	7.077245	-0.06	0.950	-14.65463 13.76169
emp_gd	.1173549	.2288926	0.51	0.610	-.3421661 .5768759
turnover_gd	-6.15e-07	1.27e-06	-0.48	0.630	-3.16e-06 1.93e-06
_cons	66.71497	6.004891	11.11	0.000	54.65965 78.77029

4.4 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with gd intervention (p = 0.9769, t= 0.0291)

**reg gd545time treatment**

Source	SS	df	MS			
Model	.026259947	1	.026259947	Number of obs =	55	
Residual	1645.17374	53	31.041014	F( 1, 53) =	0.00	
Total	1645.2	54	30.4666667	Prob > F =	0.9769	
				R-squared =	0.0000	
				Adj R-squared =	-0.0189	
				Root MSE =	5.5714	

gd545time	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treatment	-.0437666	1.504747	-0.03	0.977	-3.061908	2.974375
_cons	8.423077	1.092651	7.71	0.000	6.231498	10.61466

4.5 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' progression variance with ctg and gd intervention (p = 0.783, t= -0.288)

**reg gd545time treatment emp\_gd turnover\_gd**

Source	SS	df	MS	Number of obs =	55
Model	.063020804	3	.021006935	F( 3, 51) =	0.00
Residual	1645.13698	51	32.2575878	Prob > F =	1.0000
Total	1645.2	54	30.4666667	R-squared =	0.0000
				Adj R-squared =	-0.0588
				Root MSE =	5.6796

gd545time	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-.0418138	1.537529	-0.03	0.978	-3.128532 3.044905
emp_gd	.0012545	.0497268	0.03	0.980	-.0985763 .1010852
turnover_gd	-9.13e-09	2.76e-07	-0.03	0.974	-5.63e-07 5.45e-07
_cons	8.421262	1.304561	6.46	0.000	5.802248 11.04028

4.6 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' confidence variance with bp intervention ( $p = 0.281$ ,  $t = 1.085$ )

**reg bp33confidence treatment**

Source	SS	df	MS	Number of obs =	95
Model	645.906433	1	645.906433	F( 1, 93) =	1.18
Residual	51027.7778	93	548.685783	Prob > F =	0.2807
Total	51673.6842	94	549.720045	R-squared =	0.0125
				Adj R-squared =	0.0019
				Root MSE =	23.424

bp33confid~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-5.222222	4.813183	-1.08	0.281	-14.78025 4.335806
_cons	63	3.31266	19.02	0.000	56.42171 69.57829

**reg bp33confidence treatment emp\_bp turnover\_bp**

Source	SS	df	MS	Number of obs =	95
Model	1224.86897	3	408.289657	F( 3, 91) =	0.74
Residual	50448.8152	91	554.382585	Prob > F =	0.5329
Total	51673.6842	94	549.720045	R-squared =	0.0237
				Adj R-squared =	-0.0085
				Root MSE =	23.545

bp33confid~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	-5.435656	4.843255	-1.12	0.265	-15.05619 4.184875
emp_bp	-.051388	.1398549	-0.37	0.714	-.3291926 .2264166
turnover_bp	6.44e-07	8.26e-07	0.78	0.437	-9.96e-07 2.28e-06
_cons	62.10266	3.974264	15.63	0.000	54.20827 69.99704

4.7 Independent sample t test with equal variances assumed: there is no significant difference between treatment and control groups' timescale variance with bp intervention (p = 0.509, t= -0.662)

**reg bp35time treatment**

. reg bp35time treatment

Source	SS	df	MS	Number of obs =	95
Model	18.3410526	1	18.3410526	F( 1, 93) =	0.44
Residual	3887.28	93	41.7987097	Prob > F =	0.5093
Total	3905.62105	94	41.5491601	R-squared =	0.0047
				Adj R-squared =	-0.0060
				Root MSE =	6.4652

bp35time	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
treatment	.88	1.328471	0.66	0.509	-1.75808 3.51808
_cons	9.12	.9143162	9.97	0.000	7.304349 10.93565

**reg bp35time treatment emp\_bp turnover\_bp**

Source	SS	df	MS	Number of obs =	95
Model	292.196694	3	97.3988981	F( 3, 91) =	2.45
Residual	3613.42436	91	39.70796	Prob > F =	0.0683
Total	3905.62105	94	41.5491601	R-squared =	0.0748
				Adj R-squared =	0.0443
				Root MSE =	6.3014

bp35time	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treatment	1.001766	1.296198	0.77	0.442	-1.572972	3.576504
emp_bp	.0970563	.0374293	2.59	0.011	.0227076	.1714051
turnover_bp	-5.47e-07	2.21e-07	-2.47	0.015	-9.86e-07	-1.08e-07
_cons	8.224869	1.06363	7.73	0.000	6.112098	10.33764

**Appendix 4 Testing stage's impact on IVs, i.e. whether improves over time**

```

.. reshape long confidence intention timescale, i(numid) j(stage)
. . reshape long confidence intention timescale, i(numid) j(stage)
(note: j = 1 2 3 4)

```

Data	wide	->	long
Number of obs.	109	->	436
Number of variables	27	->	19
j variable (4 values)		->	stage
xij variables:			
confidence1 confidence2 ... confidence4		->	confidence
intention1 intention2 ... intention4		->	intention
timescale1 timescale2 ... timescale4		->	timescale

```
. xtset numid stage
      panel variable: numid (strongly balanced)
      time variable: stage, 1 to 4
      delta: 1 unit
```

```
. xtreg intention stage
```

```
Random-effects GLS regression           Number of obs   =       330
Group variable: numid                   Number of groups =       109

R-sq:  within = 0.0263                   Obs per group: min =        1
      between = 0.0003                               avg   =       3.0
      overall  = 0.0064                               max   =        4

                                           Wald chi2(1)    =        5.25
corr(u_i, X) = 0 (assumed)               Prob > chi2     =       0.0220
```

intention	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
stage	-2.017917	.8807149	-2.29	0.022	-3.744086	-.2917473
_cons	81.32584	2.454495	33.13	0.000	76.51512	86.13656
sigma_u	13.414929					
sigma_e	16.318759					
rho	.40326139	(fraction of variance due to u_i)				

---

```
. xtreg confidence stage
```

```

Random-effects GLS regression           Number of obs   =       330
Group variable: numid                  Number of groups =       109

R-sq:  within = 0.0119                 Obs per group:  min =        1
      between = 0.0088                   avg =           3.0
      overall = 0.0082                   max =           4

                                           Wald chi2(1)     =        3.32
corr(u_i, X) = 0 (assumed)              Prob > chi2      =       0.0683

```

confidence	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
stage	1.906085	1.04549	1.82	0.068	-.1430388	3.955208
_cons	58.73527	2.850397	20.61	0.000	53.1486	64.32195
sigma_u	14.583785					
sigma_e	19.603823					
rho	.35626127	(fraction of variance due to u_i)				



```
. xtreg timescale stage
```

```
Random-effects GLS regression           Number of obs   =       330
Group variable: numid                  Number of groups =       109

R-sq:  within = 0.0290                  Obs per group:  min =        1
      between = 0.0019                                avg =        3.0
      overall = 0.0099                                max =        4

                                           Wald chi2(1)    =        5.74
corr(u_i, X) = 0 (assumed)              Prob > chi2     =       0.0166
```

timescale	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
stage	-.6072113	.2534046	-2.40	0.017	-1.103875	-.1105474
_cons	10.58398	.7181037	14.74	0.000	9.176519	11.99143
sigma_u	4.0859365					
sigma_e	4.6528473					
rho	.4353989	(fraction of variance due to u_i)				

## Appendix 5

### Turnover comparison between participating and non-participating businesses

#### Group Statistics

	participation_fi	N	Mean	Std. Deviation	Std. Error Mean
turnover	1.00	53	3481154.4910	5652977.19900	776496.13600
	.00	56	4064979.5180	5971328.40700	797952.32300

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
turnover	Equal variances assumed	.313	.577	-.524	107	.602	-583825.027	1115100.725	-2794382.16	1626732.107
	Equal variances not assumed			-.524	107.000	.601	-583825.027	1113406.556	-2791023.68	1623373.629

Employee size comparison between participating and non-participating businesses

**Group Statistics**

	participation_fi	N	Mean	Std. Deviation	Std. Error Mean
emp	1.00	53	26.1887	31.68478	4.35224
	.00	56	32.4464	36.71855	4.90672

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
emp	Equal variances assumed	.937	.335	-.950	107	.344	-6.25775	6.58553	-19.31279	6.79729
	Equal variances not assumed			-.954	106.115	.342	-6.25775	6.55880	-19.26105	6.74556

Treatment assignment comparison between participating and non-participating businesses

**assignment \* participation\_fi  
Crosstabulation**

Count

		participation_fi		Total
		.00	1.00	
assignment	.00	33	25	58
	1.00	23	28	51
Total		56	53	109

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	1.512 <sup>a</sup>	1	.219		
Continuity Correction <sup>b</sup>	1.077	1	.299		
Likelihood Ratio	1.515	1	.218		
Fisher's Exact Test				.252	.150
Linear-by-Linear Association	1.498	1	.221		
N of Valid Cases	109				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 24.80.

b. Computed only for a 2x2 table

Turnover comparison between treatment and control businesses that participated in final interview

**Group Statistics**

	assignment	N	Mean	Std. Deviation	Std. Error Mean
turnover	.00	25	3236082.3600	4256379.70161	851275.94032

1.00	28	3699968.8929	6733210.35511	1272457.15177
------	----	--------------	---------------	---------------

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			95% Confidence Interval of the Difference			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
turnover	Equal variances assumed	.558	.459	-.296	51	.769	-463886.533	1569318.209	-3614424.30	2686651.235
	Equal variances not assumed			-.303	46.172	.763	-463886.533	1530953.275	-3545226.02	2617452.950

Employee size comparison between treatment and control businesses that participated in final interview

### Group Statistics

	assignment	N	Mean	Std. Deviation	Std. Error Mean
emp	.00	25	24.7200	25.11228	5.02246
	1.00	28	27.5000	37.00200	6.99272

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			95% Confidence Interval of the Difference			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
emp	Equal variances assumed	.097	.757	-.316	51	.753	-2.78000	8.79491	-20.43651	14.87651
	Equal variances not assumed			-.323	47.747	.748	-2.78000	8.60948	-20.09289	14.53289

## 3.2 Recruitment and Registration

### 3.2.1 Registration Process

The initial approach to recruitment, registration and randomisation of participants (detailed in the trial protocol) was one based on coding and pre-randomisation of target businesses, a process that would be undertaken by MMU evaluation staff on the basis of lists provided by EHU and AMRC colleagues. The intention was that advisors involved in the recruitment and registration process would undertake baseline data collection activity (with firms that had expressed an interest), register those participants that agreed to go forward with the intervention, and then liaise with colleagues to unlock a spreadsheet and thus reveal the allocation of each registrant. Following the 'reveal', the advisors would discuss the structure/journey of MC\_L according to the SME's allocation to either the control or treatment group. An important feature of the approach was that the twin-route approach (essential to the trial) would not be revealed to potential participants/registrants as this would be likely to impact on their willingness to register or to commence/progress with the intervention.

In operational terms, the plan proved to be somewhat challenging. It was recognised at an early stage by advisors that, on the basis of interviewee's limited time and need to make an informed judgement re: the potential value of participation, the SME representatives in the recruitment funnel were likely to ask pointed questions with respect to the detail of the intervention and what it might mean for them in terms of timing/intensity of commitment. This caused difficulties for the advisors who were constrained significantly in their conversations and negotiations (and fearful that potential participants might be lost). As a result, the original plan was relaxed and advisors were given access to the randomisation list in advance of registration. This said, the advisors were also reminded of the critical need for entirely equal treatment of those in control and treatment groups. In addition, scripts and protocols were developed with advisors in an attempt to mitigate/obviate the introduction of bias/differential treatment into the process of recruitment and registration. Further, it should be noted that at no point did the advisors have any role in the allocation of firms on the target list. During discussions relating to progress with the MC\_L pilot with IGL and BEIS colleagues, the issue of concealment allocation and potential compromise of contemporary recommended practice in RCT protocols was raised. As a result, a revised approach to randomisation was adopted. In this new process (agreed between IGL/BEIS and the MC\_L partners), allocation concealment is guaranteed as the allocation of participants is generated subsequent to registration confirmation. An original seven-step process for recruitment and registration remained in place, though in the revised system, pre-registration randomisation was scrapped. Neither advisors, programme managers, evaluators nor potential participants have prior knowledge of allocations. On registration of participants, the recruiting advisor has access to a final page in the baseline survey document (operationalised via the SurveyMonkey platform). Here, on each access, two statements appear in an electronically randomised order. The statement that appears at the top of the page dictates allocation of the participating SME. The page – one that cannot be accessed prior to registration – is signed and date-stamped by the advisor to ensure that an audit trail is in place. The completed page is retained and shared

with programme managers and the evaluation team. A graphical representation of the initial and revised processes appears in Annex A p24. Of course, the revision to process does not address the problem identified originally by advisors, and some loss of potential participants at an early stage was likely.

### 3.2.2 Recruitment

Recruitment performance was a core theme throughout the experiment, not least as this has implications for the strength and explanatory potential of the evaluation. Analysis and commentary was undertaken throughout the trial and included in Interim Reports. This section provides a final review of recruitment and explains the factors that affected recruitment overall and at various stages in the progression of the work. The level of recruitment was undoubtedly impacted by external and environmental, most importantly by the global Covid pandemic, and to a lesser degree by Brexit.

### 3.2.3 Recruitment Statistics

The original target for recruitment was set at 160 (in agreement with BEIS and IGL). The final total for registrations to the project was 109. Whilst the project did not meet the ambitious targets established at commencement of the work, recruitment performance should be assessed against the backdrop of unprecedented circumstances in the economic and social environment. Some form of restrictions (often dramatic ones) on the operation of businesses was in place for the entire life of the project, and the situation in North West of England was frequently more restrictive than that in other parts of England. Environmental conditions are discussed in greater detail below, though it is worth stating here that recruitment performance is arguably fairly impressive given the circumstances in which it took place.

Of the 109 current registrations, distribution by cohort is as follows:

Cohort	Participant Numbers	Recruitment/Delivery
Pilot	9	December 2020/January 2021
1	19	February-April 2021
2	9	April-May 2021
3	15	May-July 2021
4	7	July-September 2021
5	20	September-October 2021
6	30	November-December 2021

The profile is clearly characterised by peaks and troughs and the marked difference between the lowest and highest cohort figures initially appears surprising (though see below). The mean recruitment figure per cohort is 15. However, this figure is somewhat meaningless given vacillation across the period of project delivery (and especially in the earlier period). The only specific cohort recruitment target was generated in relation to the Pilot roll-out, and the aim here to recruit 10 participant businesses was almost met. The aim in all subsequent cohorts

has been to register as many businesses as possible. Whilst recruitment has been somewhat erratic, it may be argued that the recruitment team deserves significant credit for its efforts throughout, and the achievement of a dramatic uptick in registrations in the period from September 2021 onwards.

### **3.2.4 Recruitment Performance by Partner**

As noted in the Interim Reports, success in recruitment has been heavily skewed in favour of EHU. Indeed, with 89 registrations recorded by the latter at the close of the project, EHU has exceeded its original target (80) by some distance. This is particularly impressive given the constrained timeframe for activities. With data available for all cohorts, it is evident that 82% of all participant firms were recruited by Edge Hill. It is also evident that colleagues at AMRC have struggled with recruitment throughout the project's run, though the situation was improved from Cohort 5 onwards. Of the 24 participant businesses included in the penultimate cohort, approximately 25% were recruited by AMRC, and of the 32 recruited for Cohort 6, 14 (44%) businesses were AMRC recruits. The performance in Cohorts 5&6 represent a strong uptick in performance for this organisation.

One of the more important factors in the imbalanced performance has been the approaches to recruitment adopted by the respective partners. EHU has operated from the outset with a highly direct form of contact with potential recruits. Using a database of known eligible businesses, the organisation has worked systematically to contact prospective participants to explain and promote the benefits of taking-part. Of course, EHU personnel also used (a) established contacts, and were able to engage with businesses that had taken part in previous training and awareness-raising programmes, and (b) marketing via high-profile business support organisations and networks. It should be noted though, that both of these channels were limited – EHU's network is not particularly extensive. The approach adopted initially by AMRC – and for a significant period into the project – was qualitatively different and relied much more heavily on dissemination and development of contacts via 'networks of networks'. The organisation has significant experience of providing training and support to SMEs and has previously enjoyed success via marketing its offers through partner institutions and business networks. In the case of MC\_L, this relatively indirect approach did not work well and it has become evident that a more direct, kinetic and personalised approach is likely to pay dividends. AMRC's problems with its networked approach may be a consequence of the external and unique circumstances into which MC\_L was launched, though there is some evidence (generated via qualitative research within the project) that participants value personal and unmediated contacts above less focused and diffuse modes of marketing.

### **3.2.5 Recruitment Initiatives and Ameliorations**

The pressure to achieve targets was taken seriously by all parties from the outset and was a priority agenda item for both partner project meetings (initially weekly, then monthly from early May 2021), and weekly operations meetings initiated in December 2020. Indeed, much of the discussion in the latter meetings was focused on the issue of recruitment and how

improvements in performance might be achieved. Intensive discussions involving EHU and AMRC project leaders took place throughout the period of the initial main phase delivery. These were designed to examine the factors implicated in limited recruitment success at AMRC (a pattern noted during recruitment for the Pilot then Cohort 1), and to explore options for rapid uplift in success. It was recognised at this time that the withdrawal of an experienced member of the AMRC team from operational activity had not aided the situation. The operations meetings were utilised as an opportunity to review progress, share good/successful practice, and to collaborate on the creation and refinement of a range of marketing assets. The meetings were also used to share pipeline reports and to consider SME profile data, the latter an important ingredient in more focused targeting.

In acknowledgement of the relative shortfall in recruitment, a detailed marketing plan was created by AMRC in March 2021. This focused, in part, on leveraging on the organisation's networks and on the exploitation of regional events, existing contacts and North West manufacturing ambassadors. Whilst a reasonable and well-intentioned initiative, its initial impact was limited and the issue of recruitment was identified as a priority risk factor for the project. The original AMRC plan was subsequently elaborated and expanded (with EHU involvement) to include a range of tactical actions. These included the implementation of improved candidate profiling techniques and the negotiation of improved access to organisational data sources and CRM systems. Unfortunately, AMRC's recruitment performance remained sluggish and further revisions were initiated with respect to recruitment activity in Spring and Summer of 2021. The allocation of significantly greater resource to recruitment (in terms of input hours for existing staff and the co-option of additional colleagues) was implemented, though again little impact was observed for cohorts 2-4. Indeed, only 1 of 25 firms was recruited by AMRC in this period. In September, as the issue came to a head, renewed efforts were launched at AMRC and a new (experienced and well-connected) colleague was introduced to the recruitment team. At this stage, the partner also revised its recruitment approach to one that more closely resembled that deployed by EHU. The appointment and change of track saw a turnaround in performance and AMRC achieved a substantial relative uplift in its contribution to registrations.

In addition to the AMRC-specific efforts to increase recruitment, some joint initiatives were undertaken within the consortium to boost registrations into the programme. These were launched in recognition of (a) the countdown to completion (and a compressed timescale for operations following a later start than expected), (b) clear difficulties in the external operating environment, and (c) the requirement to maximise recruitment as a means of underpinning the robustness of the experiment. One of the initiatives involved a partnership with East Lancashire Chamber of Commerce. The Chamber was resourced from within MC's marketing budget and tasked – via the organisation and facilitation of a number of 'taster' workshops - with driving potential participants into the programme. Following early evaluation, the initiative was perceived as a failure and rapidly closed-down. A further initiative involved contact with the Business Engagement function at Manchester Metropolitan University's Business School. The latter has been involved in several funded business development programmes and has a range of relevant businesses available in its database. Conversations were agreed in



September (to be led by AMRC), though problems were encountered with absence of key staff and the exchange of leads was minimal. In addition, and as a means of optimising use of its marketing budget, EHU contracted an external marketing and recruitment agency in September 2021 to aid in generating contacts and leads. This proved to be a beneficial move with successful recruitment to MC\_L of a significant number of relevant SMEs.

### 3.2.6 Hampering Factors

As noted in interim reports throughout the project, the Covid pandemic was been highlighted by many target firms as a blockage to participation in MC\_L. Indeed, some indicated at the height of the pandemic (especially those approached by AMRC) that their business was unlikely to survive the coming quarter. Other SME leaders indicated a lack of 'headspace' for training as efforts were devoted entirely to survival or to securing immediate financial resilience. Supply chain problems also constituted a key issue, with some manufacturers unable to access raw materials, and others experiencing production disruptions as a result of a shortage of primary inputs/parts. In the period since the third lockdown, yet more businesses reported a critical lack of production and management staff and an inability to recruit the workers they needed to resume production: for them, involvement in non-core functions such as training/technology awareness has not constituted a priority. In addition, some SMEs reported contraction and re-positioning in the post furlough and government support-package period: for them, Covid provided an opportunity to re-think business models and to reconsider the basis of their competitive advantage: MC\_L was perceived as either an unnecessary drain on time, or a programme that may be of greater value in the future. Of course, for some businesses, Covid sadly resulted in liquidation – an outcome seen (albeit infrequently) in recruitment and follow-up activities within the project. At the level of individual SME managers, for some Covid has either provided opportunities with alternative employers, or has triggered – via fear of redundancy - moves into parallel employment. Indeed, significant churn was been witnessed in a number of organisations and this either impeded recruitment or retention within the project, or follow-up in the final interview programme.

Certainly, the timing of roll-out of MC\_L was unavoidably unfortunate. Though it has not been possible to fully quantify the impacts of Covid on the project, it can be asserted reasonably that the pandemic (and its multi-faceted implications) impacted very negatively on participation in the programme. It can also be expected that Covid will constitute an important thread in the Business Basics story overall

Finally, on the theme of Covid, it is worth examining impacts on recruitment via the utilisation of a timeline perspective. Using the Institute for Government's Covid lockdown timeline<sup>5</sup> we were able to plot recruitment to respective cohorts against various periods of lockdown and tiers of restriction. With respect to the Pilot Cohort, recruitment and delivery took place during (a) the second lockdown in England (5<sup>th</sup> November to 2<sup>nd</sup> December), (b) the application of Tier 4 restrictions in the North West of England, and (c) the commencement of the third

---

<sup>5</sup> <https://www.instituteforgovernment.org.uk/charts/uk-government-coronavirus-lockdowns>

national lockdown (6<sup>th</sup> January)<sup>6</sup>. Whilst targets were almost met, it is not surprising that recruiters reported significant difficulties. Recruitment to the first main cohort took place in February and March 2021, a time at which ‘stay at home’ and Tier 4 orders remained in place (the latter covering much of the NW region). Whilst recruitment was generally pleasing, much greater numbers had been anticipated and again recruiters reported difficulty with respect to engagement with targets. Cohort 2 was a disappointing one in terms of numbers but the operational period was one marred by ongoing (if relaxing) restrictions and, perhaps more importantly, a lack of certainty and security among business leaders and regional and national politicians. The Step 2 ‘roadmap’ re-opening of some businesses and recreational and educational facilities was at a nascent stage with many firms adopting a ‘wait and see’ approach. Cohort 3 gave rise to some optimism as numbers increased significantly. The period May to July was one in which vaccination had started to reach reasonably high-levels and many workers and businesses were demonstrating greater confidence. However, Covid remained high on the agenda for businesses and the early aftermath (and recovery period) saw SME leaders distracted by key priorities of production re-starts and continued efforts to create resilience. The fourth cohort was recruited over the summer holiday period and was very disappointing in terms of recruitment. To their credit, some inside the consortium saw the timing as a mistake and the impact of Covid is perhaps less prevalent here (though still an important factor for the same reasons as those encountered with Cohort 3).

Recruitment for cohort 5 took place in September and October, a period in which vaccination penetration was reaching its zenith in England, and the impacts of lockdown had started to wane for some manufacturers (though we would not wish to diminish the gravity and impact of ongoing labour and supply-chain problems). Performance from both partners was relatively impressive and, in addition to the weakening impact of Covid, it can be reasonably surmised that the growing confidence and expertise of recruiters, and increased allocation of resource to the task of registration, is reflected in cohort size.

The same factors were probably at play in with respect to recruitment for Cohort 6. The vaccine programme continued in England in the recruitment period (November and December) and third/booster vaccines were becoming available to an increasing proportion of the population. Restrictions had been relaxed significantly, and whilst businesses confronted ongoing and significant challenges, greater confidence and a forward-looking perspective among SME managers was in evidence. Whilst the Omicron variant of Covid was on the horizon, its impacts were felt largely beyond the Cohort 6 delivery period. Within MC\_L, resourcing for recruitment had reached its height and the additional member of staff on the AMRC team appears to have delivered increased success. So too, the use of an external marketing agency by EHU appears to have impacted positively on recruitment.

---

<sup>6</sup> It should be noted here that large parts of Lancashire and the NW endured T4 restrictions for far longer periods than other regions of England

Whilst further work in relation to periodisation and issues of temporality is required (though this is beyond the scope of the current evaluation), a basic timeline-based analysis provides useful insights with respect to variances in recruitment across the project cohorts.

Before moving to a summary of the section, the implications of Brexit for participant recruitment (and retention of businesses within MC\_L) are worthy of note. Comments gathered by recruiters, and underpinned by qualitative interview data, point to (a) significant problems experienced by some SMEs (especially those with a substantial import or export component to their operations), and (b) the impacts of the latter in terms of willingness or ability to join or remain within MC. Pressures brought to the attention of MC\_L facilitators and evaluators include: reduced availability of labour as some EU nationals have exited the UK; supply chain difficulties contingent on new border controls; reduced access to - and increased costs of - critical inputs; and, increased resource allocation to meet new administrative and regulatory requirements. Whilst again, it is not easy to quantify the impact of such factors on recruitment to MC, at an anecdotal level, there is clear evidence that some businesses have been distracted from strategic planning by demands at an operational level.

### **3.2.7 Summary and Key Points**

Recruitment was a key consideration at the conception and planning stages of the project, and in all discussions relating to implementation. The theme remained high on the agenda throughout the operationalisation of the work, and it was acknowledged from the outset that a strong recruitment performance would be important to the success of the experiment overall. Indeed, recruitment remained the priority risk factor at all stages of (and for all those working in) the project from its inception.

The environment into which MC\_L was launched was not a propitious one in any respect. The concatenation of a major political, trade and economic rupture with an extended national and international health crisis implied that conditions for the prosecution of the trial were very difficult indeed. The ambitious targets set for MC\_L recruitment were useful in terms of driving effort and aspiration, though ultimately – and for the reasons noted above and more – proved unachievable. This said, much was achieved and the final recruitment figure approaches the lower-end of the range (120-130) considered in early discussions. Moreover, the performance of one of the recruiting partners was exemplary and EHU exceeded its own partner target substantially. Indeed, had both partners been able to perform at such a high level, the stretch targets for participation would have been achieved. In addition, much has been learned with respect to the maximisation of recruitment in Business Basics type interventions/experiments and some key points of learning (direct approaches, partnering considerations, performance leadership and turnaround etc.) are set-out in the paragraphs above. Perhaps most importantly, it is evident that the project has resulted in the evolution of a robust and systematic approach to recruitment, one that is repeatable, scalable and a source of good practice.

## 3.3 Facilitator Feedback

### 3.3.1 Introduction

As detailed in the trial protocol, evaluation of process elements of the intervention was perceived to constitute a key element of the work: significant effort was applied in the design of an evaluation system capable of capturing detailed data/evidence with respect to the operation and performance of all core components of the project. As a key part of this plan, data was gathered throughout the development and delivery of the intervention from those actors involved in its design, implementation and management. This data was used extensively to inform early revisions to the various stages of MC\_L, ensure that improvements to delivery could be implemented throughout, aid reflections on what might be working well within the programme (and what aspects of the intervention might require refinement), and guide consideration of the ways in which the project might be developed for application across a wider geography and business audience.

Data was gathered systematically from the following actors (referred to collectively as 'facilitators' in the text below):

1. Programme leaders, managers, and recruitment and delivery agents at both main delivery partners (EHU and AMRC)
2. Expert advisors from technology vendor companies (contracted to the project)
3. Representatives from technology adopter companies (contracted to the project)

The data collection process - one designed to gather largely qualitative evidence, though with some quantitative components - was multi-faceted and involved:

- Completion of 'facilitator feedback surveys' at the conclusion of delivery to participant cohorts
- Extended discussions in project planning and design meetings (pre-operationalisation)
- Extended discussions at weekly (and subsequently monthly) project partner meetings during and beyond the project delivery phase
- Observation of delivery practice and processes in workshop events for Treatment group participants (the lead evaluator attended 13 of 14 such workshops)
- A final facilitator survey and interview exercise at completion of the delivery process (detailed reporting in relation to this exercise appears in the following section of this document)

We note here the skew in the evidence from facilitator interactions in favour of Treatment participants. The comments in surveys from some facilitators – in particular, vendors and expert adopters - relate largely to the Treatment sessions. This results from such actor's engagement to work primarily in the Treatment workshops. However, the surveys are also used by delivery actors (from EHU and AMRC) to provide comment on Control activities and outcomes. Further, partner project meetings provide a forum in which ideas are surfaced in

relation to possible project enhancements for both participant groups. It should also be noted that recommendations for revisions in content and delivery are not driven solely by facilitator comment. The views expressed in participant surveys were blended with those from facilitators to provide a basis for decisions in relation to refinements. The theme of participant feedback is addressed in subsequent sections of the report.

In this section we report in summary form on the findings from the various elements of the facilitator-focused research and how these were applied in development of the project. Much more detailed reportage with respect to findings and their outcomes/deployment can be found Annex A to this document. However, prior to examination of the findings from facilitator-related data gathering, it is useful to set-out here some notes in connection with the evaluation of project set-up processes. As some in the facilitation team were intimately involved in aspects of project set-up and preparation for launch, this section provides an appropriate space for the discussion.

### **3.3.2 Project Initiation**

Evidence with respect to ‘process’ was gathered largely via observation and engagement in partner discussions in the project set-up phase. It was reassuring to see substantial enthusiasm from all partners in the early phases of the work, and rapid movement to initiate administrative, communications and file-sharing systems. Early efforts were also applied to address issues of privacy, confidentiality and GDPR compliance with the creation of relevant documentation to be applied throughout interactions with project participants and any partners and agencies with a role in the study. Interactions with partners at IGL were also extensive in the start-up period, one that became protracted as negotiations took place with respect to various elements of the trial protocol (most significantly in relation to sample size, recruitment and registration processes<sup>7</sup>). Indeed, as noted elsewhere in this report, the roll-out of the intervention was delayed by some months by extended negotiations, and envisaged timing of delivery to the planned cohorts was disrupted.

Implementation of the project was also hampered by the ongoing Covid pandemic and the various measures imposed by government as a means of limiting the spread of infection. The MC\_L team was observed to act quickly and decisively to the situation, and the entire project was rapidly re-designed for on-line delivery (the original intention had been that Treatment participants would attend in person at the Peer-to-Peer mediated CtG and GD workshops). The re-design was a very demanding task and the team deserves credit for its creativity, speed and resolve.

Some attention in the early stages of the work was devoted to the creation and allocation of project roles, and some recruitment was undertaken to ensure that all necessary capabilities were available within the delivery team. It was also necessary to recruit colleagues into the

---

<sup>7</sup> Significant further commentary in relation to issues of project start-up and operational process appear in the Registration and Recruitment section of the report.

independent evaluation team to ensure that a high level of statistics capability would be in place<sup>8</sup>.

### 3.3.3 Pilot Cohort

Delivery to the Pilot cohort commenced at the end of January 2021 (some eight months after notification of the award) and followed a highly intensive period of preparation, contracting of partners, establishment of administrative systems, and negotiation with programme managers. The pilot was acknowledged as a critical moment in the development of MC\_L, and analysis and evaluation of the exercise and its outcomes was perceived to be crucial in determining the future structure, content, mechanics and pitching of the intervention.

Evidence in relation to the Pilot cohort was gathered via three main routes: first, analysis of responses to the facilitator feedback survey; second, structured conversations in weekly partner meetings; and third, interrogation of participant feedback collected from 'in process' surveys (i.e., those embedded in the materials delivered to both Treatment and Control participants). Reporting below focuses on the facilitator survey, though material from contemporaneous discussions with facilitators is woven through the narrative.

The pilot delivery saw the first application of the facilitator survey, a document that was emailed to all those involved in delivery of the sessions/materials for both CtG and GD stages. The email contained a request for information and emphasised the importance of completion as this would aid further development and refinement of all aspects of the intervention. A copy of the survey questionnaire is included at Appendix A though questions in the document cover the following topics:

Overall rating of personal experience of involvement (1-10 scale)

General perception of how the event was received by participants (1-10 scale)

Rating of the appropriateness of the content and overall approach for target participants (1-10 scale)

Elements of the workshop event that were particularly positive

Elements that were less positive

Recommendations re: changes that might improve or further focus future delivery of the session

A large majority of target respondents completed the exercise and responses to the questionnaire – relating to both the CtG and GD workshops - were thorough and detailed. Following combination of questionnaire materials with that from conversations in post-workshop de-briefs and partner meetings, detailed (thematic) analysis of the qualitative responses was undertaken. In summary, this revealed the following (see Annex A pp13-18; 22-23 for full details):

---

<sup>8</sup> Further detail in relation to process-related observations concerning the project set-up period (and in particular issues of participant registration) can be found in Annex A pp4-26).

*Positives* – scheduling and duration of sessions works well. The structure and content of sessions is robust and preparatory materials for participants are useful. Quality of communication and facilitation is strong. Breakout sessions with a P2P discussion focus are valuable and many participants are well-engaged.

*Negatives* – time constraints are problematic and some re-balancing of priority between segments would help: breakouts are too rapidly truncated and should be extended. The ratio of facilitators to participants in breakouts is too high and participants need time to ‘warm-up’ to optimise engagement. Vendors too easily slip into ‘sales mode’. Levels of interaction can be improved.

*Recommendations* – increase interaction and engagement; encourage and reinforce multi-way peer communications; optimise time use; focus on presentation of benefits of adoption; revisit survey questions to ensure fit and clarity.

On the basis of facilitator comments, a substantial list of suggested recommendations was drawn-up for discussion among the team. The majority of recommendations were adopted and actioned rapidly, and significant amendments were effected (in relation to delivery strategy, session content and structure, and facilitation practice) in the intervention<sup>9</sup>. Whilst subsequent delivery of the workshops was not radically overhauled, important revisions and additions to form, content and style of the events were initiated on the basis of pilot feedback.

### **3.3.4 Facilitator Feedback - Post-Pilot**

Given the perceived success of the pilot exercise, and the associated approach to ‘process’ data capture, the Facilitator questionnaire was deployed in subsequent delivery of MC\_L to the first two main phase cohorts (1&2). Again, the survey generated useful commentary, that in concert with evidence derived from post event de-briefs and project partner meetings, was used to fashion minor but positive revisions to a range of elements of intervention structure, content and delivery. In addition, the feedback was used to aid in the development of project protocols, for example, those relating to participant deferrals and returns in the project. Full lists of revisions to practice and process appear in Annex A on pages 39 and 55.

The facilitator survey tool was discarded after cohort 2 as (a) detail in responses had started to dwindle, (b) summer vacations implied that some facilitators were unavailable to complete the questionnaire, and (c) the need for surveying had diminished. Discussion with facilitators revealed a common perception that the intervention had reached a mature stage and that the content and structure of workshops was stable and working well: thus, the survey was no longer required. Subsequent data collection in relation to delivery to cohorts 3-5 was undertaken via observation and structured discussions in monthly project partner meetings. Little further tweaking of workshops and materials was necessary, though feedback was

---

<sup>9</sup> See Annex A p17-18 for a comprehensive list

helpful in determining the factors that are perceived drive positive outcomes for participants (for details, see Annex A pages 67, 74 & 95).

### 3.3.5 Facilitator Feedback – Quantitative Data

Finally in this section, it is useful to consider the responses provided by facilitators in relation to the initial group of questions in the facilitator survey. Quantitative data is available from surveys undertaken following delivery to each of the first three cohorts, and from the final survey. The latter was undertaken at the close of the final delivery of MC\_L and contains questions that mirror those in the earlier survey. The first question requests that facilitators record (numerically) their experience of involvement in the delivery session. The facilitators are all experienced presenters and business educators (or business support staff) and it was perceived to be useful to understand how they rate their experience of the intervention. The second question asks facilitators to rate their perception of how the session was received by participants. Again, on the basis that the facilitators are all experienced business support practitioners, it was useful to know of their perception of participant’s reactions to the event. The third question seeks details re: how facilitators rate the appropriateness of session content. Responses (aggregated across the CtG and GD workshop events) are presented in Table 3.1 below.

Table 3.1 Facilitator Self-Ratings: Experience, Participant Reception and Content

All questions on a 1-10 scale. 10 is highest score	Q1 Experience	Q2 Participant Reception	Q3 Content & Approach
Cohort Pilot	8.1	7.9	8.3
Cohort 1	8.4	8.0	8.7
Cohort 2	8.3	8.4	8.6
Final Survey	7.7	8.0	8.1

With respect to question 1 (experience) there is some consistency across cohorts and ratings are fairly high. There is a slight overall increase from CP to C2, though a substantial dip at the final survey stage. Whilst the final survey rating remains reasonably strong, as explained elsewhere, the average was reduced by two particularly low scores (these based on negative personal experiences with particular aspects of delivery/performance). Overall, in qualitative feedback (reported in Annex A), most facilitators express faith in the design and content of the intervention, and satisfaction with its outcomes. Again, there is some consistency across cohorts in relation to question 2 and a reasonably high score is maintained throughout: in qualitative feedback, facilitators indicate that participants overall report a high degree of satisfaction, and that many are inspired to progress their journey to technology adoption on the basis – in part at least – of their engagement with MC\_L. Ratings in relation to question 3 are particularly strong across the cohorts and reflect general satisfaction with the quality of MC\_L content and the approaches to delivery that have evolved throughout prosecution of the experiment.



### 3.3.6 Summary

Process evaluation at the project initiation phase was undertaken via detailed conversation with key actors and observation of the evolution of consortium relationships, administrative systems, operating protocols and project materials. Whilst delays and challenges were experienced, the project leadership and management teams addressed these with professionalism and creativity, and were able to ready a complex but robust intervention for effective launch with some rapidity. The challenging external environment and protracted negotiations around the trial protocol implied a late start to delivery (with some likely impact on recruitment), though the team's effort and evolved approach to the latter ensured that a reasonable sample size was secured.

The use of facilitator feedback surveys and associated tools (e.g., structured discussions and observations) has contributed significantly to the evaluation effort with respect to process mapping and monitoring. Evidence from facilitator feedback surveys, combined with that from participant surveys, aided substantially in (a) development and refinement of workshop structures and content, and (b) shaping enhancements to facilitator practice. Review and refinement work was ongoing throughout the entirety of the delivery process, though only relatively minor revisions (to both Treatment and Control group sessions structures and materials) followed the more substantial revisions associated with feedback from the pilot intervention. This said, the latter changes were not major ones and early and thorough work on intervention design provided a robust and durable platform for the project as a whole. Feedback in relation to preliminary (i.e., Baseline and Business Profiling) and 'in process' surveys, i.e., those embedded in the workshop content, was highly valuable in identifying incongruities and omissions, and in suggesting solutions. The overall impact of the feedback and the actions that this stimulated were certainly instrumental in the enhancement of experiences and outcomes for participants.

## 3.4 MC\_L Facilitator Final Feedback Survey

### 3.4.1 Introduction

Following completion of delivery to the final cohort, a survey questionnaire was circulated to all facilitators (i.e., delivery personnel, experienced technology adopters and vendors). The aim of the survey was to gather views with respect to (a) the personal experiences of those involved, (b) the perceived performance of the intervention, (c) beneficial and less positive elements of the work; and, (d) steps necessary to facilitate successful continuation or wider roll-out. Seven responses (from 14 invitations to participate) were received: two of these were from vendor representatives and five from project delivery team members. Unfortunately, none of the adopter/implementor companies is represented. One respondent requested an interview (in preference to completion of the questionnaire) and several follow-up conversations were undertaken following receipt of completed survey forms. The data generated via the exercise is largely qualitative, though questions 1-3 required a numeric response. Survey questions are set out below in turn with related responses: for questions 4-6, we provide a summary table of responses and associated commentary.

### 3.4.2 Analysis of Survey Responses

*Q1. Please provide a score for your overall personal experience of involvement in MC\_L (using a 1-10 scale where 1 is least positive and 10 is most positive).*

The question was designed as a follow-on to those used in facilitator surveys following delivery to the first three cohorts. The seven responses deliver a broad spread of values, of which two are fairly low. Post survey conversations indicate that low scores are connected respectively with personal experience in relation to recruitment, and perceived poor yield in terms of 'hot leads' for a vendor from the Treatment workshops. However, the majority of participants score highly (8-10) and the average for reported personal experience is 7.7. This score is broadly in line with those recorded in connection with facilitator experience of working with early cohorts.

*Q2. What is your general perception of how MC\_L was received by participants (using a 1-10 scale where 1 is 'very poorly' and 10 is 'extremely well')?*

Again, the question was included as a follow-on to questions deployed in the earlier round of facilitator surveys and is designed to elicit views with respect how well the intervention might 'land' with participants. The assumption here is that all facilitators – as experienced educators/trainers/consultants/business experts – will be well placed to judge the reception of MC\_L among participants. The overall score at 8.0 again reflects earlier feedback and is pleasing as all respondents will have experienced detailed feedback from their communications with participants. In conversations, some respondents that allocated higher scores indicated that these reflect the enhanced experience delivered to Treatment participants.

*Q3. How would you rate the appropriateness of MC\_L's content and overall approach for target participants (using a 1-10 scale where 1 is very weak and 10 is very strong)?*

The aim of the question was to access views with respect to the overall appropriateness of content and programme design for the target group. The average score from respondents is 8.1 and subsequent conversations revealed a generally high level of satisfaction with the programme, its content and its evolution. Few reservations were expressed with respect to intervention content and its delivery to both groups, though some respondents indicated that they would wish to see more in terms of practical demonstrations of system capabilities in any future iteration of MC\_L.

*Q4. What aspects and elements of MC\_L did you find to be particularly strong, positive or beneficial (please provide bullet point answers here)?*

The question seeks to access the views of facilitators with respect to the more positive elements of the programme. Some responses were full and detailed and the majority of facilitators indicated that they believe the concept of MC\_L as a whole is robust, focused and capable of delivering high-impact for target participants. The table below summarises responses and is organised to reflect the prioritisation of themes (or components of the intervention) as extrapolated from survey forms or subsequent conversations.

Peer to Peer interactions in Breakout Sessions	<p>Participants benefit significantly from the opportunity to discuss issues with experienced adopters/users and vendors</p> <p>The opportunity to ask business and sectors specific questions is a valuable element of the project overall</p> <p>All experts are approachable and speak eloquently and in detail with respect to issues of adoption, implementation, challenges and funding</p> <p>The mix between vendors and expert users works well and interaction is strong</p> <p>Experienced user representatives (from SMEs) are highly cooperative and well-informed (they also communicate and connect very well)</p>
Content	<p>Content in the Treatment sessions is now neatly evolved, appropriate for a large majority of participants, and effective in building awareness, knowledge and confidence</p> <p>Cases provided to Control participants are well-received and well-pitched for the audience</p> <p>Use of real-world examples provides relevant and focused help</p> <p>Diagnostic content is helpful in highlighting aims and needs – this feeds neatly into Treatment workshop sessions</p> <p>Use of charts and visualisations works well in communicating information to a non-specialist (sometimes inexperienced) audience</p> <p>Panel sessions cover much ground in an accessible and easily digestible format</p>

	Material in relation to challenges is well-pitched and well-received by participants – explanation of the common and generic nature of many challenges provides reassurance
Structure and Facilitation	The structure of both Treatment and Control interventions is now well-developed, and is effective and efficient in operation All sessions/activities have a logical flow Facilitation and chairing of sessions is of a high-quality Summary sessions at the close of panels work well (as does a check on participant understanding of the materials)
Scheduling	The scheduling of Treatment sessions is appropriate for busy firms and the length of sessions is appropriate (this allows for rapid pacing and a variety of activities) Control participants report satisfaction with self-directed learning and are appreciative of the convenience that this provides The Control format provides for collective and collaborative viewing of materials inside participant companies and is reported to constitute a strong stimulus for discussions
Direct Recruitment	The adoption of a direct approach to targeting potential participants has proven successful The contracting of a professional recruitment agency worked well in generating further participants in the later stages of the work
Participants	Quality of participant SMEs has been very pleasing – active engagement has been strong Participants have provided useful feedback throughout (especially in relation to adoption plans)

The peer-to-peer element of breakout sessions is perceived to be particularly valuable, especially insofar as it increases active engagement and encourages participants to pose questions of direct relevance to their business and aspirations with respect to technology. The quality of expert interaction, advice and communication is applauded, as is the mix of experts within the sessions. Session content for both participant groups (T&C) is also perceived in a positive light and the evolution of this up to and beyond the Pilot is acknowledged. Pitching and relevance are perceived to be appropriate and the aim to cover all important ground/themes (as a means of increasing awareness and knowledge, and instilling confidence) is recognised. The use of specific tools such as visualisations, cases and real-world examples is thought to work well, as are the materials designed to address challenges in adoption and implementation (a particular concern for many participants). Issues of session structure, facilitation and scheduling receive a fairly comprehensive examination and there is general agreement that the 'shape' of interventions (in terms of flow, pace and coverage) is strong, as is the quality and clarity of facilitation and communication. In conversation, some respondents refer to 'positivity' in workshop facilitation/communication as a means of inspiring confidence and allaying concerns. The same measured and realistic positivity is seen in the case materials supplied to Control participants. Scheduling is perceived to work well for both groups with facilitators reporting positively on (a) the latitude and convenience provided by the Control approach, and (b) the timing of Treatment sessions to ensure 'low-impact' on business and operational demands. Some facilitators highlight the issue of recruitment and allude to the importance of high-impact and high-efficiency approaches (direct contacts and contracting of dedicated agencies) in generating registrants to the programme. Finally, some facilitators allude to the quality of participants recruited into the programme and their willingness to

engage actively in the intervention: the preparedness too of participants to provide detailed feedback is noted.

*Q5. What aspects or elements of MC\_L were less positive or successful in your view (please provide bullet point answers)?*

This question inverts the requirements of its predecessor and requests that respondents reflect on elements of the intervention that are perceived to be less successful. Again, responses to the survey are pleasingly detailed and there was an opportunity to probe some answers in subsequent conversations with facilitators. The table below summarises responses and is again organised to reflect respondent prioritisation of themes.

Surveys	<ul style="list-style-type: none"> <li>Survey are perceived to be overlong and onerous</li> <li>The need for regular surveying requires clear explanation and justification</li> <li>Some questions could be stated in a more direct and accessible format</li> <li>Questions are repetitive</li> <li>Questions feature too much jargon and an academic tone is not appropriate</li> <li>Surveys are cited as a cause of drop-out at the early stages of the intervention</li> </ul>
Registration	<ul style="list-style-type: none"> <li>The online registration process is challenging – there is overlap between the Baseline and Business Profiling surveys and much repetition (this has impacted on recruitment and retention)</li> <li>It is very difficult to recruit participants whilst only offering a vague description of the delivery model (as a consequence of allocation concealment requirements) – again, some participants were lost as a consequence</li> </ul>
Recruitment	<ul style="list-style-type: none"> <li>Some approaches to recruitment, especially the indirect ‘network of networks’ approach were unsuccessful</li> <li>The Link with East Lancashire Chamber of Commerce also failed to deliver expected numbers</li> </ul>
Vendor Discipline	<ul style="list-style-type: none"> <li>Some vendors work in ‘sales’ not advisor/expert mode</li> <li>Vendor view - poor quality of leads and insufficient follow-through to sales: vendors need participant details in advance in order to plan approaches</li> </ul>
Platform	<ul style="list-style-type: none"> <li>The Evenito platform is glitchy and unstable</li> <li>Some Treatment participants experienced problems with access and exited the programme as a result</li> </ul>
Delays	<ul style="list-style-type: none"> <li>Delays with start-up and extended negotiations re: trial protocols and data collection processes impacted negatively on progress</li> <li>The discussions had a knock-on effect on recruitment and implied that it was necessary to recruit to additional cohorts at a late stage in the programme</li> </ul>
Risk and Exposure	<ul style="list-style-type: none"> <li>The Control offering was perceived to be sub-standard in comparison with EHU’s normal quality of interventions (in terms of intensity and level of support): there is some reputational risk involved (and it is noted that some Control participants recorded negative feedback)</li> </ul>
Inter-project Sharing of Data and Ideas	<ul style="list-style-type: none"> <li>Whilst an opportunity to share ideas and discuss progress with the leaders of parallel trials was expected (and would have been useful), this aim was not realised</li> </ul>

The greatest concern among facilitators relates to the number and length of surveys that are included in the programme. Whilst there is an acknowledgement that some surveying is necessary (and that additional questions were required as a result of the experimental nature of the work), several facilitators report that surveys appear too frequently, their purpose is not always obvious, some questions could be phrased/explained with greater clarity, arcane terminology is inappropriate - and of greatest concern - the extended initial surveys are a cause of early exit from the intervention. These are important issues, and whilst any post-experiment version of the intervention will eliminate substantial elements of existing questioning, it is evident that close attention should be applied in efforts to reduce, combine and simplify surveying activities. Registration and recruitment issues too are of concern to many involved in their operationalisation and management. Again, the negative impact of (repetitive) surveying is raised, though the greatest challenge relates to issues of allocation concealment. Those with responsibility for registration report that their inability to fully detail for prospective registrants the intervention pathway both dented confidence and commitment, and led to the loss of participants. Whilst such a situation should not occur in any further deployment of MC\_L, the lesson here is an important one for those planning future experiments. On approaches to recruitment, there is a strong indication that the 'direct contacts' approach adopted by EHU was far more successful than the indirect 'networking' approach deployed (initially) at AMRC. Further, some respondents caution with respect to selection of recruitment partners: the contracting of East Lancashire Chamber to aid with recruitment is perceived to have failed (primarily as a result of the latter's poor performance).

As noted elsewhere in the report, the discipline of some of the vendors involved in the intervention is called into question. One company in particular is perceived to have been too eager to market its own services, rather than to offer objective advice to participants (and this despite numerous requests from programme managers to adhere to contracted terms). The lesson here relates clearly to care in selection and ongoing monitoring. On technical issues, there is some criticism of the Evenito platform – the latter was found to be only partially stable and some participants reported access problems. A move to Zoom in later stages of the project was a wise one and few if any problems were reported subsequently. Use of commonly used platforms appears wise in any future on-line intervention work.

Two of the three final 'less positive' elements relate to project start-up and administration issues. First, some survey respondents allude to the substantial delays that resulted from extended negotiations in relation to the trial protocol, and cite these in connection with non-optimal sample size and the need to organise additional late-stage cohorts. Second, the non-appearance of plans for cross-project sharing is raised – members of the delivery team were eager to discuss progress with other consortia in BB3 and believe that much beneficial cross-fertilisation of ideas would have been possible. The final theme raised under the 'less positive' banner was focused at institutional level. Some facilitators expressed the view that the quality of the Control experience fell below that expected by participants in the institution's existing offerings, and that reputational damage might ensue. It is to be hoped that the learning that

has emerged from hands-on delivery (and the project evaluation) will aid in the construction of an experience that meets all necessary institutional quality criteria.

*Q6. What recommendations or improvements can you suggest - or what factors do we need to take into account - as we consider scale-up of MC\_L for delivery to a wider and more geographically dispersed population?*

This question was included with future operations in mind, and was designed to surface views and ideas with respect to the amendments, additions and changes that might be required to ensure that MC\_L is configured appropriately for successful delivery to a broader audience in the UK. Some of the responses (again thematised and set-out below in approximate rank order of priority) relate back directly to issues raised as both positives and negatives associated with MC\_L. Their inclusion and resolution is fairly obvious, thus, the discussion at the foot of the table in connection with these themes is relatively brief.

Peer to Peer	Continue with experienced adopter/user companies as expert advisors Ensure care in selection, preparation and management of vendors
Optional Pathways or a Blended Offer	Permit participants to select their route – either self-directed or P2P workshops A blended offer is required wherein elements of the two existing pathways can be combined Alternatively, default to Treatment only and re-launch self-directed delivery only after careful consideration of all aspects
Breakouts and Panels	Implement longer breakouts to facilitate greater specificity and focus (provide more time for P2P discussion and questioning) Theme breakout and ensure that participants are able to circulate if desired Align vendor specialisms to participant needs in breakouts Support participant engagement by focusing on ‘experienced problems’ – ensure that participants have greater input to dialogue
Content, Structure and Scheduling	Consider feasibility of post session one-to-one discussions (to better understand needs and planning, and reinforce ‘routes out’ and next steps) Consider sector specific sessions and ‘out of hours’ sessions to reduce interference in business operations Use further practical examples and include demonstrations of the technologies in use
Surveys	Reduce number and length of surveys and questions (and avoid repetition) Ensure accessibility of surveys for all potential users
Recruitment Process	Abandon the selection/allocation process at recruitment Consider and deploy the most effective approaches Contract specialist/professional recruitment agencies (at an early stage) to maximise participation Review marketing collateral to ensure the broadest possible engagement
Platform	Reliability is crucial – migration to Zoom or Teams
Roles	EHU and AMRC to adopt a hub and spoke model – preparation for ‘training the trainers’

There is clear evidence in responses of a serious desire to continue and to scale-up the MC\_L intervention. All comments are positive and constructive and there is a strong sense that the project - in its mature and evolved form - provides a robust model, platform and protocol-set for further development into a multi-regional or national-scale delivery programme. Features of the model are perceived to be highly-attuned to the needs of manufacturing SMEs, and the project's success in translating 'intention' into realised adoption (or into credible plans for near-term adoption) are cited as evidence that MC\_L should be developed and applied beyond the North West region.

All respondents allude either directly or indirectly to the substantial value of P2P interactions, and faith in P2P interchange as a factor in the promotion and successful adoption of technology is universal among facilitators. Inclusion of P2P components in Treatment workshops was perceived to have been highly successful and it is no surprise to see recommendations for the continued use and development of P2P in any future iterations of the MC\_L model. Recommendations are to continue with existing 'adopter' expert companies and with some vendors, though a number of facilitators caution that careful selection is required in relation to vendors, and that further preparatory and management measures will be required.

Most respondents provide some reflections on the possibility of a participant-selected dual pathway or blended offer. There is good evidence that both legs of the experiment have worked well (in terms of increasing awareness, knowledge and confidence with respect to technology, and in promoting adoption and reducing timescale to investment), and that participants overall in both Treatment and Control groups rate their experience highly. There is also a recognition of the respective benefits to participants of the two modes of delivery (convenience versus P2P). Thus, many facilitators suggest that both pathways – 'facilitated on-line with P2P' and 'on-line self-directed' – should be offered as options to future participants. There is also consideration of the benefits of blending some of the features of the two existing pathways into a combined model.

The panel and breakout sessions in the Treatment mode were perceived to be of particular value and their extension is recommended (as a means of promoting further engagement in discussion and questioning). More specified thematization of breakouts is also suggested, along with an effort to align vendor specialisms with the identified technology needs of participants (this to ensure optimisation in terms of time-utilisation). On the issues of content, structure and scheduling, facilitators suggest targeted refinements such as (possible) provision of post session one-to-one consultations, the creation of sector specific and 'out of business hours' workshops (where numbers and demand justify this), and greater reliance on demonstrations of technologies in use.

Strong views in relation to surveying and recruitment processes are expressed in earlier sections and recommendations in relation to the former, as expected, include revision and reduction of the surveying load, awareness of accessibility issues with respect to survey completion, and combination of surveys where possible (to remove repetition). In relation to



recruitment, comments focus on securing enhanced efficiency and success via the use of 'direct contact' approaches, the contracting of dedicated recruitment agencies, and the refreshing of marketing materials and strategies. With respect to the future role of MC\_L partners – should the model be adopted or developed for wider application – facilitators envisage the establishment of a hub and spoke model, wherein EHU and AMRC staff will create and deliver a training and support package for colleagues from selected spoke/network delivery agencies.

*Q7. In your role as a (a) technology specialist/vendor, or (b) user/adopter of performance-enhancing technologies, can you provide brief details of any post-event interactions with MC\_L participant firms? (this will help us to track post-event engagement and moves towards adoption).*

This question was designed to gather information with respect to any post-delivery contacts between experts (vendors and example user companies) and MC\_L participants. In the event, responses were provided by both experts and some staff involved in delivery. Colleagues at AMRC report the provision of assistance to six MC\_L participants as the latter worked towards completion of Made Smarter applications. In addition, AMRC staff were able to aid a number of companies in their quest for information in connection with implementation challenges and options. EHU colleagues report the referral of MC\_L contacts to AMRC (to pursue MS applications), and to vendor partners in order to explore system options. These colleagues further report several requests (handled internally) for further support and advice in relation to system specification, successful implementation, and avenues to funding. One vendor reports a number of enquiries seeking advice in relation to process mapping. The vendor company went on to work closely with two firms as they moved towards system selection and adoption.

Anecdotally, it appears that much post-participation communication was in play, and that many participants were able to access further support from delivery agents and vendors. Unfortunately, the data was not collected or recorded in any systematic way. This can be seen as an oversight and learning point in terms of the evaluation, and the requirement for systematisation of future post-event data contacts data capture is clear.

*Q8. Do you have any further comments with respect to any aspects of your involvement in MC\_L and the project's operationalisation?*

A common catch-all request was included at the close of the facilitator survey as a means of revealing any issues that had not been surfaced by earlier questions. Whilst only a small number of responses was received, some of these were helpful. One fairly philosophical contribution suggested that, as effective and valuable as the MC\_L had been, some participants are delivered only to a point of 'conscious incompetence' via the intervention: further and structured follow-up is required and a specified and more tailored 'routes-onward' programme, would be of significant benefit. Another facilitator commented on administration systems within the consortium and a perceived need for more efficient document sharing facilities. Finally, a respondent from a vendor company indicated that s/he had found the

experiment to be an excellent foundation, and that proof of concept was now in place. S/he also indicated that the company would be very eager to be involved in development of any future MC\_L related activity.

### 3.4.3 Summary and Key Points

*Ratings* - facilitator ratings in relation to experience of involvement in MC\_L, perceived participant reception of the intervention, and appropriateness of content and delivery are all high at 7.7, 8, and 8.1 respectively. The ratings are also close to those recorded by facilitators earlier in the project in responses to similar questions in the Facilitator Feedback Survey. The feedback from the final facilitator survey (and associated conversations) indicates that all facilitators perceive that MC\_L has delivered a strongly positive outcome for participants, and that the content and related delivery mechanisms (especially in the treatment route) are highly developed, efficient and effective.

*Positive elements of the intervention* – primacy here is afforded to peer to peer engagement and interaction, and all facilitators acknowledge the importance of P2P in ensuring participant satisfaction and successful outcomes from the workshops. The opportunity for Treatment participants to discuss their needs and concerns, and to ask questions of expert users and vendors is perceived to offer excellent support and encouragement to adoption. The quality of vendors and expert users and their ability to communicate with clarity on real-world issues is applauded, as is quality of content and appropriateness of structure in the intervention sessions. Application of live examples (in relation to challenges, outcomes and benefits), and use of real-case data is perceived to have both impact and appeal.

*Less-positive elements of the intervention* – practical components of project implementation and management are highlighted here. The issues of registration and recruitment feature prominently, with facilitators discussing the tension between allocation concealment and the provision of sufficient information re: participant pathways that is necessary to secure registrations. With respect to recruitment, it is clear that the latter took place in a very challenging environment, though a ‘direct contact’ approach is perceived to have largely overcome external obstacles and delivered significant success. The issue of project surveys is also highlighted, with calls for clarity and economy in future survey-related project design. Further practical concerns are raised in relation to the stability of the project’s technology platform, delays in commencement of delivery (a result of extended negotiations with programme managers), and the selection and preparation of appropriate vendors.

*Improvements and considerations for scale-up* – respondents are unanimous in supporting the concept of scale-up and cite the project’s ‘intention conversion’ success, and the robust, mature and effective nature of the model as compelling reasons for continuation and wider application. Facilitators again refer to the strength and benefits of the P2P approach, highlighting its centrality in any further iteration or expansion of the project. Facilitators also recommend the development of (a) an ‘optional routes’ offer, wherein participants can select their preferred pathway (online with P2P or online asynchronous), or (b) a ‘blended’

programme that would combine the benefits of existing pathways. Numerous ideas for further improvement of the intervention are floated with suggestions for novel approaches to scheduling ('out of hours' and sector-specific modules) and new elements of content (practical demonstrations and post session 'one-to-one' discussions). The role of the MC\_L consortium is also discussed with the suggestion that facilitators might form the 'knowledge transfer' hub in a 'hub and spoke' expanded network model.

*Post-event interaction* – the level of post-event interaction is high with all respondents indicating some involvement in offering further guidance, support and signposting to participants. Vendors report assisting two companies to fully-fledged technology adoption, and delivery partners have progressed several businesses to Made Smarter funding applications in connection with adoption.

## 3.5 Participant Feedback from Connect to Grow and Growth Demonstrator Surveys

### 3.5.1 Introduction

Participants in MC\_L are surveyed prior to registration (to provide Baseline data) and then again post-registration at the Business Profiling stage. The first of these surveys provides important data in relation to the characteristics of the firm, its orientation to technology, and prospective technology needs. The Business Profiling stage survey forms the first major element of the intervention and here participants are asked to consider their awareness of technologies, their confidence with respect to adoption, blockages to investment, the strength of their intention to adopt, and timescales for possible investment. These themes are continued into the surveys embedded in activities at the CtG and GD stages. In addition at these later stages, participants (in both the Treatment and Control groups) are asked to reflect on their experience of participation in the sessions. Four relatively simple questions are posed in the survey – one requires a closed (rating-based) answer and three are open-ended, and require a text-based response. The questions are presented as follows:

- Q1. Please rate your overall experience of this session (1-10 rating negative to positive)
- Q2. Please list any elements of the *session content* that you found to be particularly useful
- Q3. Please list any elements of the *delivery* of the session that you found to be particularly useful
- Q4. Please list any suggestions for improvements to the session

The questions are designed to contribute to both the project's process and performance evaluation and mirror those posed to facilitators and examined in the section above. In this section, we set out the data gathered from participants in the seven cohorts and examine the results for the Treatment and Control groups respectively.

### 3.5.2 Participant Experience Ratings

The table below presents data gathered in relation to Q1 listed above and reports the ratings attributed by participants at the CtG and GD stages for the seven delivery cohorts. Numbers in brackets refer to number of participants that record a view. It should be noted that not all participants at each stage provide a response to the rating question.

<b>Connect to Grow</b>	<b>Treatment</b>	<b>Control</b>
Pilot Cohort	8.2 (5)	7.5 (2)
Cohort 1	8.5 (4)	8.25 (4)
Cohort 2	8.5 (4)	8 (5)
Cohort 3	9 (6)	7.85 (10)
Cohort 4	9 (2)	8 (3)
Cohort 5	6.75 (8)	8 (5)
Cohort 6	9 (6)	6 (9)
<b>Average across cohorts</b>	<b>8.4</b>	<b>7.66</b>
<b>Growth Demonstrator</b>	<b>Treatment</b>	<b>Control</b>

Pilot Cohort	7.25 (4)	5 (1)
Cohort 1	8.25 (4)	10 (1)
Cohort 2	9 (2)	8.25 (3)
Cohort 3	8.5 (6)	7.9 (5)
Cohort 4	8.5 (2)	9.5 (2)
Cohort 5	7.2 (6)	9.5 (3)
Cohort 6	9.75 (4)	6.5 (8)
Average across cohorts	8.35	8.1

We note that at the CtG stage, in only one cohort (5) does the Control group record a higher score than its Treatment counterpart. However, at the GD stage, the Control group in three cohorts (1, 4 and 5) record a higher score than their Treatment counterparts (though where this is the case, Control numbers in the cohort tend to be low). Overall, at both the CtG and GD stages Treatment participants tend to rate their experience more highly than Control participants: average scores for Treatment and Control respectively are 8.4 and 7.7 at CtG, and 8.4 and 8.1 at GD. This said, both groups in all cohorts appear to rate their experience highly both for CtG and GD. Scores for CtG only dip below 7 in one cohort each for Treatment and Control participants, and for GD only Control participants record two cohort scores below 7. Combining groups and stages and assessing all cohorts, more than 25% of scores are at 9 or above, and more than 65% at 8 or above. Indeed, it is evident that the vast majority of participants across both groups and all cohorts report a very strong positive experience in relation to their engagement.

### 3.5.3 Session Content and Delivery and Recommendations for Improvement

Questions 2 and 3 request participant feedback with respect to elements of session content and delivery that are perceived to be useful. Q4 requests suggestions for improvements to the sessions. In some cases, only brief comments are offered by participants in both groups, and many participants elect to forego the opportunity to offer details. However, the material that is provided in feedback statements is valuable and was deployed (in combination with feedback from facilitators) to aid in the development of materials and delivery mechanisms throughout the experiment.

Before continuing to a discussion of findings in relation to participant groups, we note that this section offers only a brief overview of the feedback volunteered by participants in the CtG and GD sessions: much further detail is available in Annex A (pp 19-21, 40-41, 55-57, 68-69, 74-75 and 95-97).

*Treatment Group* - the feedback from Treatment participants in relation to content and delivery was generally more detailed than that of Control respondents. Comments in relation to content focuses *inter alia* on: the quality and value of materials relating to challenges in implementation and how these might be addressed; the need for planning in relation to change management (and development of personnel); pacing with respect to implementation; the identification of relevant funding supports; and, the need to examine an organisation's specific and longer-term requirements before progressing to specification or adoption of systems. With respect

to delivery/structure of the workshops, Treatment participants focus heavily in their comments on the importance of breakout sessions and the opportunity to pose direct and specific questions to expert users and vendors. The quality of peer experience and interchange is highlighted as the most important element of the intervention, and the opportunity to learn from the rich experience of adopters is perceived to be both valuable and inspiring. Whilst commentary is largely positive, useful suggestions for improvement are advanced in relation to: extension of breakout sessions (to facilitate additional P2P activity); the inclusion of practical demonstrations in workshop sessions, experimentation with face-to-face delivery (when possible); and, workarounds to delivery platform glitches.

*Control group* - in general terms, responses from Control participants indicate that the use of video case studies is helpful – the cases are thought to be clear and focused, and the content is reported to be relevant to experience and aims. Cases and materials relating to factors in successful implementation and the management of change are reported to be particularly informative, as are those relating to the application and benefits of specific systems and access to funding support opportunities. The structure of sessions is applauded for its clarity and simplicity, and asynchronous delivery is perceived to offer benefits in terms of flexibility. Suggestions for improvements, although offered by only a minority of Control participants, include the removal (or explanation) of technical and business jargon, more attention in materials to barriers and risks, an opportunity to view (via video cases) relevant technologies in action, and the provision of bullet point summaries of cases and other materials.

#### **3.5.4 Summary**

Feedback scores in relation to experience are highly pleasing: whilst there is some difference between Treatment and Control participants in their ratings, the differences are small and both groups appear to value their experience of participation highly, with two-thirds of all participants scoring at 8 or above. Though comment in relation to questions connected with content, delivery and improvements is sometimes brief (and not all participants choose to submit their view), the material is useful in building an understanding of 'what works' and where attention is needed in relation to development of materials and delivery. Delivery mechanisms and session structure appear to be attractive and effective and content is perceived to be valuable and thought-provoking by a majority of participants. It is notable that Treatment participants highlight in particular the importance of breakout sessions and opportunities for P2P engagement and interchange.

## 3.6 MC\_L Participants: Final Interview Programme

### 3.6.1 Introduction

This section details findings from the MC\_L final (evaluation) interview programme. Final interviews were planned from the outset of the work and were designed to ensure that it would be possible to track the progress of participants in each cohort beyond the close of the four main stages of the intervention. In particular, it was hoped that it might be possible to identify any cases of 'realised' adoption and advanced and qualified plans for near-term adoption. In addition, the interviews were designed to gather data with respect to (a) change in participant firms' thinking and actions with respect to investments in technology, and (b) shifts in confidence in relation to adoption planning and securing appropriate supports. The interviews were also configured to elicit views with respect to participation in the programme in terms of quality of content, delivery and outcomes.

It was envisaged initially that interviews would take place at 12 weeks after completion of main stage activities for each cohort. The rationale was that this time would permit a sufficient period for reflection and for the emergence and development of adoption-related planning and actions (and in some cases perhaps, moves to realised adoption). Unfortunately, given the backdrop against which the study was operationalised (discussed elsewhere) and ill-health within the evaluation team, interviews for some cohorts were undertaken at 14 weeks plus, and for others (in particular, the final cohort) at just 8 weeks after completion of the programme. Given initially weak recruitment into the programme, the addition of two further cohorts (beyond the four originally envisaged for MC\_L) implied some time compression and a scramble to gather data prior to the close of the project funding period. Thus, the material below should be read with the caveat that a uniform 12-week period between delivery for each cohort and related final interviews was not possible.

Early efforts to contact potential interviewees were handled solely by the evaluation team. After experiencing some difficulty with recruitment to interviews, a decision was taken to request that the programme delivery teams (from EHU and AMRC) might assist with the engagement of participants. Thus, a system was evolved whereby the evaluation team issued initial email invitations to interview (with a fairly detailed covering mail outlining issues and questions for discussion), then subsequent telephone calls to participant firms were made by delivery and recruitment personnel. This approach worked well and EHU and AMRC partners were able to schedule interview appointments with pleasingly large numbers of informants. The interviews themselves were undertaken entirely by the evaluation team lead. All initial interview registrants (109 in total) were invited to interview and as detailed below, almost half accepted the invitation. All those invited were also offered an opportunity offer their feedback by email, though only two firms elected to use this route.

### 3.6.2 Participation

As can be seen in Table 3.2 below, a total of 53 MC\_L participants took part in the final interview process. Of these, 51 participants were interviewed directly and 2 responded by email. Whilst it had been hoped that it would be possible to recruit between 75 and 80% of all participants for the final interview, a total of almost 50% of all initial registrants is considered reasonable given the circumstances in which the interviews took place. Interviews with early cohorts were organised in the full lockdown stages of the Covid pandemic, and those with later cohorts were scheduled as participant firms were involved heavily in restart and recovery activities.

Table 3.2: Participation in the Final Interview Programme

Final Interview: Participation (by stage of exit/completion)		
	Treatment	Control
Baseline	1	0
Business Profiling	2	2
Connect to Grow	2	7
Growth Demonstrator	23	16
<b>Total</b>	<b>28</b>	<b>25</b>

As indicated in the table, it was possible to interview only a small number of those participants that took part in only the early stages of the intervention: just 5 companies that exited at or before the Business Profiling stage are included in the data (3 from the Treatment group and 2 from the Control). Overall, a greater number of final interviews was undertaken with Treatment participants, and a significantly larger proportion of this group was retained in the programme until its conclusion (23 as opposed to 16 from the Control group).

### 3.6.3 Elimination of Bias

Given the unbalanced nature of the interviewee population, various tests were applied to assess the possibility of bias. Full details are provided in section 8.4 of the quantitative data chapter of this report. Results indicate that no bias is evident as a result of firm characteristics (such as turnover and employee size). They also indicate that treatment/control assignment does not introduce bias. To test further, differences in the Baseline characteristics of the Treatment and Control interviewees were compared, and no significant differences among firms were identified. A more detailed test in relation to progression was also undertaken. This final test finds that progression to CtG or beyond, regardless of Control or Treatment designation, has a significant positive impact on participation in final interviews (as might be intuited). In combination the tests provide useful reassurance with respect to minimal levels of possible bias, and the findings set-out below can be read in this light.



### 3.6.4 Interview Content

A common interview schedule was used with all interviewees (see Appendix B). The final survey protocol was designed to gather views and feedback in relation to two key themes: first, participant's intentions with respect to adoption, implementation or optimisation of productivity-enhancing technologies (and the factors implicated in such intentions); and second, their perceptions of the project, including overall experience, perceived benefits and suggestions for improvements.

Specific questions were posed in relation to:

- Current technology usage (including forms and history)
- Intentions with respect to adoption of or investment in business technologies or related services and activities
- Forms of technology of actual/potential or specific interest
- Timescale for adoption
- Planning and preparation for adoption
- Barriers/hampering factors
- Intended/expected impacts of adoption
- Influence of the MC\_L intervention in decisions/thinking/actions (if any)
- Experience of engagement in MC\_L (rating of experience and possible benefits)
- Suggestions for improvements to the programme

The interviews were designed to be straightforward, compact and direct (this to minimise demands on informants' time). Many were completed in the 10-15 minute timeframe suggested in the initial invitation mail. However, some participants were eager to speak at length with respect to their experiences and intentions. Extended conversations were not discouraged and a number of interviews lasted thirty minutes or more.

The materials generated via the interviews were analysed via the application of multi-level thematic coding and pattern matching techniques. Use of automation software was considered, though the idea was not pursued as a result of time and reporting constraints. The findings from the programme are set-out below in a structured form and follow the flow of the interview schedule. In the interests of economy, some of the categories/themes in the list above have been combined. Comments and views from the Treatment and Control groups respectively are set-out under each thematic heading.

### 3.6.5 Interview Programme: Findings

#### *Intention to adopt*

The notion of 'intention to adopt' is a key one for the project overall: the study's primary research question focuses on the potential of a direct peer-to-peer approach within the

intervention to increase intention to adopt beyond that achieved by an indirect (on-line, asynchronous and non-peer mediated) approach. Quantitative evidence with respect to intention to adopt was gathered at each intervention phase of delivery for each cohort, and the results from this data-gathering are presented elsewhere in this report. In the final interview programme, the aim was to collect detailed and more granular data with respect to intentions, and to highlight possible incidence of realised adoption or the qualified development of clear plans for, and routes to, adoption. Whilst the conversational data recorded in the interviews is highly qualitative in nature, it has been possible to undertake a basic (though structured) quantification in relation to some details. To effect this, each of the 53 respondent firms was rated on a 1-5 scale in terms of its reported intentions with respect to adoption of productivity-enhancing technologies.

The rating scale is configured as follows with simple criteria for allocations:

Rating	Criteria
1	No intention to adopt
2	Some intention to adopt but no clear plans or funding in place (any adoption is likely to be a relatively distant aspiration)
3	Intention is at a developed level with some planning for adoption in place – research and planning is ongoing (though adoption is likely to be in the medium to longer-term)
4	Intention is well-developed and credible and adoption is highly likely (probably in the near- to medium-term)
5	Intention at the highest level with adoption either realised or imminent

The following Table (3.3) presents the ratings for the entire population of interviewees for which it was possible to determine a score (three participants were unable to provide clear details with respect to intentions or plans). The table also presents data relating to the Treatment and Control participants within the population.

Table 3.3 Intention to Adopt (Quantification of Interview Data)

Rating	Treatment	Control	Total
1	2	3	5
2	3	6	9
3	4	4	8
4	6	3	9
5	10	9	19

The total number for which categorisation was possible is 50 and the population includes even numbers (25/25) from the Treatment and Control groups. It can be seen that Control participants have relatively higher representation in the lowest ‘intent’ categories (9 as opposed to 5 in the 1&2 ratings) and Treatment participants have relatively higher representation in the highest categories (16 as opposed to 12 in the 4&5 ratings). The split is even (4/4) at the mid-point rating. The average intention rating for the Treatment group is

3.76, and that for the Control group is 3.36. However, this crude comparative analysis masks a significant level of complexity (see below).

Considering each band in turn, and combining the groups, it appears that only 5 firms (10% of the sample) have no current intention or plans to adopt. Nine firms (18% of the sample) report only a vague intention, and eight firms (16%) report some intent, with accompanying planning and preparation. In the higher ratings, nine firms report strong levels of intention and preparation, and nineteen firms, almost 40% of the sample, report that adoption has either taken-place or is imminent and assured. Combining the firms in the higher categories (4&5), it appears that well over half (56%) of the sample exhibits a strong or realised intention to adopt one or more productivity-enhancing technologies. Whilst these figures are encouraging, again there is much complexity in the picture.

To explain the complexity further, ratings were determined on the basis of currently reported levels of intention to adopt. As a result, they do not reflect important dimensions or features of existing technology adoption and deployment. Indeed, the interviews revealed that many firms (especially, though not exclusively larger SMEs) have been previous investors in technology and are currently operating with ERP, CRM or MRP systems. Some of these are planning further investments/adoption, though some are not. Those in the latter category will have been rated at 1 or 2 in accordance with currently reported plans and thinking.

Other nuancing factors include the following:

*Technology renewal and upgrading* – several firms report that they are undertaking (or planning to undertake) renewal or upgrading of existing systems. Where this is the case, they have been rated with respect to strength of intent.

*Integration of existing systems or investment in/implementation of training programmes* – as above with ‘renewal’, where firms report investments in technology integration or human resource/capabilities in connection with technology, they have again been rated on strength of intent. Several firms with systems currently in place report that they are considering or planning such activity.

*Attribution* – the attribution of ‘influencing factors’ with respect to ‘intention to adopt’ is explored in greater detail below. However, it is worth noting that although some of the firms in the population report high levels of intent, a small number are explicit that planning predates participation in MC or that thinking has not been (or is only marginally) influenced by participation.

### ***Realised Adoption – the Role of MC\_L***

On the issue of attribution, one of the most important findings to emerge from the final interview programme relates to those firms that report ‘realised adoption’ (or confirmed and credible

plans for imminent adoption) on the basis of participation in MC\_L. In sum, 13 participant companies are allocated to this category.

*Treatment Group* – interviews with Treatment group informants reveal that seven firms have either adopted or are at an advanced stage in the process of adopting performance enhancing technologies. Those in the latter category indicate that they have committed to adoption but (at the time of interview) are awaiting confirmation of funding support or delivery and installation of related equipment/software. Two companies reported investment in CRM technologies, and one each investment in ERP, MRP, stock control and production control technologies. The final company reports investment in optimisation and integration of existing systems. Three companies report that technologies have been installed and implemented, and three that such installation is expected within 3-6 months. Only one company indicates that its commitment will be realised over a period of approximately twelve months. When questioned on the role of MC\_L in decisions relating to adoption, four indicate that participation has impacted directly (i.e., that it has stimulated new thinking, further research, product search and decision-making), and three that MC\_L has impacted indirectly (i.e., that the intervention constitutes a major but not sole stimulus for system adoption).

*Control Group* – discussions with Control participants surfaced reports that six participants from this group have adopted (or are in the process of adopting) relevant technologies on the basis of their involvement with MC\_L. One firm has already implemented, two are expecting implementation within 1-3 weeks, and two have committed funding and effort and anticipated adoption and implementation within 3-6 months. The remaining firm has recruited a new and senior colleague to handle all aspects of product search, procurement and installation. In the words of the interviewee, the company's CEO had been "blown away" by his participation in MC\_L and had moved immediately to invest in recruitment of a productivity systems expert. Systems adopted (or planned) within Control group organisations include CRM (4 participants) and finance (1 participant). Notably, two companies have worked with one of the MC\_L vendor companies immediately following completion of the programme and have invested in that vendor's suggested solutions. With respect to the role of MC\_L in stimulating adoption, three companies claim that participation has imparted a direct and definitive influence on decisions and related actions, and three indicate that the programme has provided an indirect, though core stimulus for progression.

Taking both groups together, six 'realised/committed' adopters indicate that MC\_L has led to further interactions with delivery partners (EHU or AMRC) or with vendor partners in the programme as a precursor to adoption. These interactions have reportedly aided planning and preparation for adoption (for example, development of a business case, consideration of implementation impacts, or consideration of RoI), and in three cases, the development of an application for funding to the Made Smarter programme. In all six cases, the participants report that MC\_L has been crucial in 'opening doors', the provision of qualified connections, and signposting to appropriate funding schemes. Indeed, all thirteen firms that cite MC\_L as a major stimulus with respect to technology adoption are both enthusiastic and complementary with respect to the programme and its outcomes.

Beyond the MC\_L-inspired realised adopter (or close to realisation) group, many businesses on a less rapid or direct route to adoption either indicate explicitly that MC\_L has been a factor in their planning, or allude to the positive influence of the intervention's role in their progress. These 'influenced' firms are less likely than their 'inspired' counterparts to place MC\_L's impact at the heart of their decision-processes, though the linkage between participation and organisational thinking is established. A small number of SMEs – especially larger ones – acknowledge the value of MC\_L but report explicitly that their advance towards adoption has not been influenced by attendance. In the Treatment group, seven firms (all rated between 3-5 in terms of intention to adopt) can reasonably be categorised as 'influenced' by their participation. Of these, two are moving towards technology integration or upgrading and the others towards first or additional adoption. Representatives of one large SME indicate that the firm was already at an advanced stage on the adoption pathway and that MC\_L played a supporting and confirmatory role. A similar picture is evident with respect to Control participants and again, seven firms in the 3-5 rating band can be categorised as positively influenced by their engagement. Three of these are moving relatively slowly to adoption but acknowledge the value of MC\_L in their planning. Of the remainder, adoption is on the near-to mid-term horizon, though again, two firms indicate that the intervention has supported or validated existing thinking rather than opening new pathways.

In sum, the MC\_L intervention appears to have been successful with respect to stimulating almost immediate take-up of relevant technologies amongst a significant proportion of participants. Further, it is reasonable to expect that more participants will move to adoption in the medium- to longer-term as a consequence (in part at least) of engagement with the programme. The project also appears to have recorded significant success with respect to impact-related 'value for money'. Indeed, it appears to have exceeded expectations outlined in the Regeneris report (2013)<sup>10</sup> where expected return/yield (in terms of technology adoptions) for a publicly funded intervention of the nature of MC\_L would be in the region of eleven<sup>11</sup>.

### ***Technology Needs and Selection***

The project content focuses on three main classes of performance-enhancing technologies, CRM, MRP and ERP, and much of the discussion throughout the interviews focuses on the former two. Interviewees were asked to comment on current and future foci for investment, and to discuss the forms of technology that are of greatest interest. The aim here was to assess the match between MC\_L content and the needs and preferences of participants (in

---

<sup>10</sup> Regeneris Consulting Ltd (2013) 'England ERDF Programme 2014-20: Output Unit Costs and Definitions'. Report to UK Department for Communities and Local Government

<sup>11</sup> Of course, any calculation comes with significant health warnings and the figure above is an approximate one. Regeneris reviews ERDF 2007-2013 and benchmarks and output indicators here do not map across directly to BB3. However, Regeneris in assessing public sector costs per output achieved in ERDF (the latter including technology adoptions) calculate mean and median figures of £94k and £28k respectively. Given the funding available for the MC\_L intervention at £312k ex evaluation, outputs at the median would be 11 adoptions.

part, to inform future development of the intervention). Differences between the Treatment and Control groups are minimal and there is little to report in terms of comparison. The technology of greatest interest - by some distance and in both groups - is CRM, with large numbers of participants indicating that CRM systems are critical to their future competitiveness, especially in crowded served (often commodity) markets, where an understanding of customer characteristics, purchase patterns, and future needs will be essential. MRP systems are rated second in terms of interest in both groups and significant numbers of respondents report current or intended future usage. Some with an interest/involvement in MRP systems also report an interest in associated production technologies including, for example, CNC, 3D printing and stock management software. ERP systems are rated third, and whilst in use or under consideration in mainly larger companies, such systems are viewed by many SMEs as a more substantial investment and one that is difficult to justify given company size and breadth of activities. Outside the core technology list, specific packages for finance and HRM functions are mentioned by a small minority of businesses. It appears then, that the focus within MC\_L on CRM and MRP systems was an informed and appropriate one. ERP systems are of interest to some participants and the needs of these companies are catered for within the programme as currently configured. Whilst some refinement of focus may be required for future delivery – especially in the light of further technological development – the content of the programme appears to be broadly well-targeted.

### ***Timescale for Adoption***

Participants in MC\_L were questioned with respect to timescales for technology adoption at all four phases of the intervention. The results of this element of the study are reported in the quantitative data sections of this report. The interview programme provided an opportunity to consider the possibility of shifts in timescales following post-participation reflection (and drivers for these), and to gather an update on timescales for those businesses that had taken steps in favour of adoption. The discussion here relates only to those firms that are included in rating bands 3-5 (in relation to 'intention to adopt'). Firms in band 2 frequently have no plan or only a vague idea with respect adoption timescale, and as noted above, some in bands 1 and 2 are existing users of technologies and have no current plans (or timelines) for further investment as their current systems provide all necessary functionality.

***Treatment Group*** – interview participants report a wide range of prospective and actual timescales. Some suggest that timescales have stretched since involvement in MC\_L as a result of operational and business factors, for example planned acquisitions, absence of investment capital, competing business priorities, or staffing issues (for example, non-availability of appropriately skilled labour). Here, whilst intention remains high, timescales can extend to 12-18 months. On the other hand, some report a shrinking of timescale as adoption has been perceived as a priority issue and staff time and funding has been re-directed to technology-related research and procurement. Five firms report that either their adoption is completed and that implementation is underway, or that they are involved in an ongoing programme of upgrading or systems integration. It is noticeable that those in 'intention' bands

4 and 5 tend to report shorter adoption timelines (frequently of 3 or 3-6 months), whilst those in intention band 3 are more likely to foresee a longer timescale at 6-12 months, and in some instances, as long as 18 months.

**Control Group** – as with their Treatment counterparts, Control participants report of a wide range of adoption timescales. There is some evidence of time compression and three among the interviewees report that they have completed adoption and moved to focus on system implementation (MC\_L is noted as the trigger for urgent action). Others – especially long-term technology users – report that their efforts are focused on systems upgrading, integration and development, and that work is ongoing and open-ended. Only one participant in the group reports a timescale to adoption of 3 months, and only three report timescales of 6-12 months. Indeed, the majority of businesses (eight) report timescales of a minimum of 12 months, with four suggesting that 12-24 months is more likely. Some indicate that timelines have stretched and again, operational and other considerations are important here. To provide some further context here, one company is re-considering its business model and investigating opportunities for new market penetration and territorial expansion: any technology investment will be suspended until needs are more fully understood. Another has been frustrated in its efforts to find an appropriate technology supplier. Others cite, as factors that have caused or added to delays in adoption, a need for further research, diversion of effort to work on post Covid or Brexit resilience strategies, conservatism and caution at leadership level, or ongoing plans with respect to firm acquisition.

Whilst it is unwise to rely overmuch on quantification of fundamentally qualitative data, it appears that there are both important similarities and differences between the Treatment and Control participants. Many of the blockages to near-term action are shared, and there is evidence of real eagerness and rapid action with respect to adoption on both sides. So too, some companies in both groups are existing productivity technology users and exhibit no rush to enhance or change systems that are working well. On the other hand, significantly more firms in the Control group report extended timelines to adoption (12 months plus) and some appear to be both less eager to prioritise adoption, and less comfortable in confronting blockages to action. Indeed, two firms allude specifically to problems in securing appropriate support for adoption either within their organisation or outside it.

### **Barriers to Adoption**

As with 'timescale', participants in MC\_L are questioned re: barriers to adoption of technology at various stages of the intervention. The question in the final interview was designed to elicit details of any pre-participation barriers along with details of any newly encountered barriers or hampering factors. Where relevant, respondents were asked to reflect on any workarounds or responses to challenges. The concept of 'barriers' is a broad one and there was a recognition in the intervention surveys that barriers can be both internal and external. In the final interview, respondents were asked to consider both of these forms. It should be noted that only around two-thirds of participants provided comments in relation to barriers, either as a result of limited experience or consideration of the issues, or because of a lack of time.

**Treatment Group** – a wide variety of issues was raised in interviews, some relating primarily to resources, others to external factors, and yet more to operational factors and organisational readiness. With respect to resources, there was a general recognition that any shift towards investment in new technologies is likely to be tempered by competing demands on finances and restricted cashflow. These problems have reportedly become more acute as the financial climate has been affected negatively by the global pandemic. Many firms report that they are facing rapidly increasing costs (some of which must be absorbed to maintain competitiveness): this is a factor that is likely to reduce latitude in relation to investment. Access to funding support was also raised. Whilst some participants report that they have been able to progress rapidly to adoption with support from initiatives such as Made Smarter, others have found the application process onerous and extended, or have been ruled ineligible. One company reported its frustration that its categorisation as (primarily) a services sector firm prevented an application to Made Smarter – this despite a strong and rapidly growing manufacturing operation within the organisation.

Moving to external hampering factors, both Covid and Brexit were cited as major blockages to progress (the latter especially for those SMEs with a significant import/export component to their businesses). In times of uncertainty (re: demand, market dynamics, inflation, labour supply, regulation and bureaucratic requirements), the reported impulse is to consolidation or retrenchment: the prospect of investing to support efficiencies, productivity and growth – whilst perceived to be a sensible hedge by some – is frequently condemned as an unpalatable or unacceptable risk. Other external factors relate to sub-sector norms and competitive intensity: some firms, especially smaller businesses, report that there is little pressure to adopt when others in the field are eschewing investment. Further, in traditional and stable served markets, where incumbents understand the environment and customer base well, the attraction of systems such as CRM hold little purchase. The themes of operational factors and organisational readiness were ones that drew significant and frequently detailed comment from interviewees. Several respondents alluded to the issues of downtime and staff re-training that are perceived to be an inevitable component of implementation of new systems: these are held to be especially challenging for smaller SMEs that have a limited workforce (and full order books). Further on this, one tech-enthusiastic business reported some misgivings with respect to the need to rapidly divert expert labour and effort into new projects – the impact on ongoing projects was perceived to be potentially damaging. Some participants reported consternation with respect to the limited recognition of needs and benefits (re: technology) at senior levels in their organisation. Convincing directors of the requirement to commit resource requires the development of an evidence-based business case, and this time-consuming activity can frequently result in failure. The issue of timing, and the notion that the moment to strike (re: investment decisions) is in instances of leadership transition was mentioned by three company representatives.

A further, and important, potential barrier to action relates to prospective buyer confusion with respect to technology options and the selection of optimal systems. Given that investment is a crucial decision (with potentially negative ramifications and manifold stories of failure in other



companies), some respondents report significant trepidation: the options can be many and arriving at the 'right' decision re: a firm-appropriate system will have long-lasting consequences. Counter to this, it is notable that one respondent indicates that the only important factors in system selection are 'flexibility' and 'inexpensive or free re-work' – if the purchased system is not capable of fulfilling required functionalities, then passing responsibility for a 'fix' to the supplier (at contract stage) is essential. Other frequently reported blockage factors at organisational level relate to comfort and conservatism, in particular satisfaction with existing and well-known practices and systems, and to organisational pre-alignment of capabilities and mindset. For one enthusiastic adopter (a business leader that had considered seriously the preconditions for successful implementation), a failure to align staff capabilities with an adventurous and tech-positive mindset, and to embed within the latter a clear understanding of data needs, capture, pathways and purposes, can only lead to sub-optimal operationalisation.

**Control Group** – interview respondents from the Control Group demonstrate little variance in relation to their Treatment counterparts in terms of perceptions concerning potential and actual barriers to adoption. Indeed, the key vectors of resources, external factors, and operational/organisational blockages are all rehearsed at length in the interviews. However, it is useful to sketch some of the nuances added by control participants with respect to main barrier factors. Absence of resources is frequently connected with firm size and some respondents note that micro and smaller SMEs are often only able to consider 'free' or low-cost performance solutions. As a result, this sometimes leaves them outside the interest sphere of commercial solutions providers, vendors and advisors. Again, the Covid pandemic and UK exit from the EU feature prominently in discussions: the former is seen by some as a major impediment to consideration of technology investments. The diversion of attention to recovery of lost ground and implementation of resilience mechanisms is cited as a drain on both finances and creative and strategising 'headspace'. The question of 'confidence' is also raised frequently with many informants exhibiting concern with respect to the selection of appropriate systems: again, fears are expressed that mistakes may be non-reversible and that poor decisions may impact on business development for an extended period. Whilst few informants indicate that concerns or lack of confidence might prevent adoption, fears with respect to non-optimal choices certainly appear to result in either extended pre-purchase research efforts or slowed pathways to procurement.

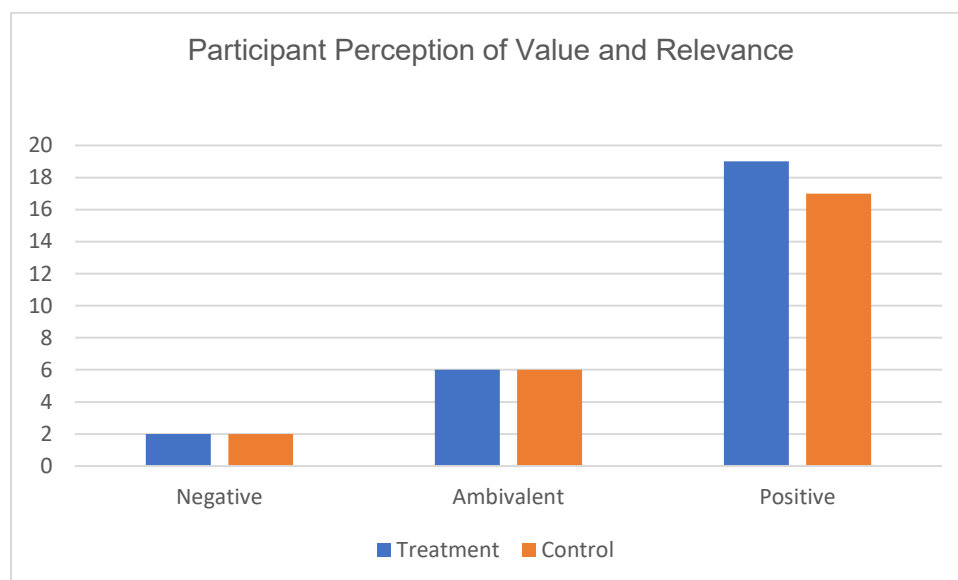
As indicated above, the notion of blockages and barriers was considered at the planning stage in MC\_L and the project was designed to both surface concerns with respect to specific hampering factors and to address related concerns by examining and setting-out solutions to the challenges faced commonly by SME technology adopters. Further comment on the nature of barriers and the performance of the intervention with respect to building confidence and pre-empting or addressing challenges is provided in the next section.

### 3.6.6 Experience of Engagement in MC\_L and Implications for Decisions and Planning

A key aim of the interviews was to build a detailed understanding of participant’s perceptions of their involvement in MC\_L, their satisfaction with the intervention, and what it might have delivered to them in terms of awareness, knowledge, confidence and intention to adopt relevant technologies. So too, the interviews were designed to elicit views in relation to what might be improved in terms of the structure and content of the intervention, and what might be required to ensure success and impact should the programme be deployed more widely in support of UK manufacturing SMEs. The materials generated via the interviews offer a considered and reflective post-participation account of satisfaction and improvement issues and are a useful supplement to other participation-related materials in the report. As may be expected, responses in the interviews – either positive or negative - were frequently detailed and voluminous. As a result, it is only possible here to explore main themes and findings for the two participant groups.

**General Perceptions of Value and Relevance** – details of participant scoring in each cohort with respect to experience of participation at various stages in the intervention appear in the sub-section above. In the interviews, participants were asked to volunteer an overall impression of their engagement with the programme. Whilst this data has not been quantified in any meaningful way, it has been possible to designate responses as broadly (a) negative, (b) ambivalent/equivocal, or (c) positive. Results for each group appear in Chart 3.1 below.

Chart 3.1 Perceptions of Value and Relevance



It is notable that scoring is remarkably close across the two groups with two ‘negative’ and six ‘ambivalent’ ratings for each. Positive ratings are only dissimilarly distributed as two additional interviews were graded for the Treatment Group. Overall, a substantial majority of interviewees (70%) report generally positive perceptions in relation to the value and relevance

of the intervention. The twelve interviewees (22%) that report a more mixed perception<sup>12</sup> offer a number of explanations, with four in the Control group indicating that the programme lacks some relevance for micro manufacturers. Those with mixed perceptions in the Treatment Group point to the stability of the delivery platform and related access issues (the Evenito platform was used for early cohorts with subsequent migration to Zoom when the shortcomings of the former were recognised). Three larger Treatment participants also indicate that the programme is pitched at too basic a level for experienced and advanced technology users. Of those interviewees that offer a negative rating (7%), explanations (delivered frequently in rather colourful language) include: the programme is superficial and patronising; too much time in sessions is wasted on surveys; sessions involve too much 'lecturing at'; vendors are overly eager to sell their product; and, public funding allocated to programmes such as MC\_L could be more effectively used if distributed directly to small manufacturers. Whilst such negative commentary should not be discounted and some pointers are helpful, the overwhelming message is one of positivity. Indeed, some with a more ambivalent view recognise a number of positive elements in MC\_L (for example, its discursive nature and signposting to further support) and acknowledge that some value was derived from their participation.

***Reported Positives and Benefits: Treatment Group*** – interviewees were requested to reflect on positive elements of MC\_L and any benefits that were experienced via involvement in the intervention. For the Treatment group, a wide range of benefits is reported and some participants provide substantial detail with respect to their experience and the development of thinking and action that has flowed from engagement. Given the weight of detail recorded in the interviews, again it is only possible to address key themes in summary form:

***Workshop organisation*** – the structure of the workshops (presentations, panel sessions, breakouts, plenaries and reflective space) is applauded by a majority of respondents. Some participants with long experience of attendance at training and awareness courses indicate that MC\_L is well-paced and well-organised (particularly so given its on-line format). Many also suggest that the content is pitched appropriately for a general SME audience. The content is perceived by a majority to be interesting, relevant, accessible, digestible and immediately applicable. Some indicate that the sessions provided a basis for the rapid development of focused discussions within their organisations. Timing of session delivery is also highlighted as a positive. The early morning scheduling is minimally disruptive and frees busy leaders and managers to move quickly back to operational commitments. The inclusion of breakout rooms in the sessions is valued by many. The facilitated, P2P oriented breakouts are perceived to offer an opportunity for detailed discussion of firm-specific needs and concerns, and the open access to experienced users and vendors is reported to facilitate valuable 'visualisation' of how systems might be beneficially configured and deployed. These findings mirror those from the 'in process' participant satisfaction surveys that are presented

---

<sup>12</sup> It is useful to note here that there is little correlation between early stage exit from the programme and more ambivalent or negative perceptions of value. Three of the four 'negative' firms completed all stages of the intervention and one left prior to CtG. Of the twelve 'ambivalent' firms, six completed, four exited following CtG and two exited following the BP stage.

earlier in this document, and it is reassuring to see that a high level of coherence in opinion is retained at some distance from session delivery dates.

***P2P in the context of workshop delivery*** – for many participants, the inclusion of a P2P element in workshops is the most important factor in the intervention’s design. Whilst there is an opportunity for discussion and questioning throughout the workshop sessions, activities in the breakouts focus specifically on interchange between participant firms and expert advisors.

The opportunity to discuss the views and experience of representatives from firms that have undertaken technology adoption (and implementation) is perceived to offer very significant value<sup>13</sup>. Some interviewees note, in particular, the benefits associated with an opportunity to hear (and to ask questions in relation to) real-world stories concerning: barriers (and how these might be addressed); challenges encountered in implementation; requirements for adjustment to new systems; advantages gained from increased visibility of data/automation of processes; and, rapidity of return on investment. Access to the experience of vendors is also highlighted as a major positive – in addition to the themes listed above, vendors are perceived to be well-placed to discuss (and respond to questions concerning) system costs, bespoke design, implementation supports, and success factors in deployment. The ability to apply learning from peer experience and exchange in the ‘avoidance of mistakes’ is also highly valued. As noted above in the discussion of barriers, many companies are eager to avoid potentially costly errors in both system specification and implementation. An awareness of potential pitfalls is perceived to position adoption aspirants well as they progress with plans to invest.

One of the less expected benefits reported by some interviewees is the availability in P2P sessions of sector specific advice: the selected vendors are perceived to display significant experience across a range of sectors (in manufacturing and beyond). So too, the expert users are able to adapt their understanding of manufacturing processes and administrative functions to aid adopters in related fields. This combined expertise implies that it is frequently possible to move from general advice and support, to the provision of more specific and focused insights at a sector level.

***Actionable learning*** – many respondents speak of the value of the intervention in terms of provision of learning that is evidence based, founded in experience, and readily and rapidly actionable. Several interviewees report that the workshop discussions stimulated almost instant creation of firm level ‘management discussion teams’ and that some of the latter have moved-on to lead either the development of investment business cases, or moves to rapid adoption. The materials deployed in the workshops, and the discussions and networking opportunities that arise from participation, are perceived broadly to support rapid but robust learning in a ‘sharing’ or ‘community’ setting. The opportunity to extend contacts and

---

<sup>13</sup> The P2P element of the intervention was very widely welcomed by participants. It is notable that no criticisms were aired with respect to P2P activities, and it appears that all participants were comfortable in relation to discussion of their firm’s positioning, aims and challenges in the company of peers.

communications beyond the close of workshops is also valued as a means of securing relevant supports in planning for adoption.

**Reported Positives and Benefits: Control Group** – given the particularities of the mode of delivery for Control participants, i.e., shared MC\_L content but with online, asynchronous and self-directed learning (and without a peer-to-peer element), the feedback from Control interviewees has some different foci to that of Treatment informants. This said, there is broad positivity with respect to the quality of the intervention and general agreement in relation to the value and impact of content. As above, given the volume of feedback, it is only possible here to present main findings in aggregate form.

**Session organisation** – participants are guided to work at their own pace, though there is an expectation that each main phase (CtG and GD) will be completed within a week to ten days. Several interviewees note that they are comfortable with asynchronous delivery as this permits them to work when convenient and provides flexibility to attend to the operational needs of the business as necessary. Few participants report any problems in accessing materials, though one interviewee alluded to his own poor engagement – an issue that he ascribed to the absence of pressure from a course leader or peer-learning group. The availability of content on-demand and support available from organisers is applauded, as is the level and frequency of communications from the MC\_L team.

**Session content** - most informants report that session content is relevant, clear, easy to use and easy to digest. Sixteen respondents refer specifically to the high quality of content, and some allude to the care taken in the production of videos. One informant – a training veteran – indicates that the content and quality of information provided in MC\_L is ‘much better’ than that offered via other sources. Pitching of content is perceived by most to be appropriate for a mixed manufacturing SME audience.

The video case studies included in the package are highlighted in terms of their awareness-raising and explanatory benefits. Some participants refer to the videos as ‘compelling’ and indicate that they are able to capture significant useful and practical advice from the short films. The structure of the videos and ground that is covered in each is perceived by many to be well-judged: although delivery is remote and on-line, some informants allude to the value of ‘real-world’ voices and to the impact of seeing authentic practitioners speaking with respect to their experience of adoption and implementation.

Materials relating to (a) potential benefits of adoption, and (b) possible challenges and pitfalls in the adoption and implementation process are particularly welcomed. Those relating to value and return on investment are also applauded. Some respondents allude positively to the ways in which materials build confidence, assist in recognition of potential blockages, and aid consideration of pre-adoption preparations, planning and case-building. One participant indicates that the material was particularly useful in helping to drive organisational change as it “informs, excites and energises”. Others in larger SMEs, three of which are existing technology users with an interest in further adoption, indicate that the content is valuable in

terms of validating and confirming existing decisions and directions. For others at an earlier stage in the adoption journey, MC\_L content is perceived to provide a ‘positive push’ and impetus to further action.

**Future and next steps orientation** – the signposting that is embedded in later elements of content appears to be valued and several interview informants allude positively to the future orientation of the materials. Advice and pointers with respect to funding programmes is welcome, as is that relating to routes to additional support and direction (from business support agencies and higher education providers). Suggestions for connections to vendors are also highlighted as a valuable component of the programme. A focus on preparation of participants (in terms of awareness, knowledge and confidence) to plan for next steps is widely welcomed.

### 3.6.7 Suggestions for Improvements

The final question in the interview requests that participants focus on suggestions for improvements in relation to MC\_L: informants are asked to set-out their views on any aspects of the programme (from aims and organisation through to structure, content and delivery) that they consider might be revised positively. The question is prefaced with some context in relation to possible further development of the intervention for dissemination to a wider business audience. Responses are almost uniformly positive and constructive, though a small number of more critical comments are aired. Given the number of interviewees, the range of backgrounds from which they hail, the particular needs of individual organisations, and the breadth of experiences represented in the group, it is not surprising that wide spectrum of views is evident. Again, differences in delivery modes also feature in results, though there is significant commonality across themes raised by Treatment and Control participants. To provide brevity and clarity, suggestions for improvements are set-out in tabulated form below (Tables 3.4 and 3.5). Whilst no formalised ranking of issues is attempted, the issues that appear towards the top of each table are those that were raised more frequently during interviews.

Table 3.4 Treatment Participants: Suggestions for Improvements

Surveys (pre-intervention and ‘in-process’)	Surveys – initial questioning (in Baseline and Business Profiling sessions) is overly demanding Too many questions Some questions are not easily understood Reduce business and academic jargon Questioning at the close of CtG and GD sessions is unnecessarily dense Purpose of some questions is unclear Improve and simplify questions and framing
Structure: breakouts and discussion	Dedicate greater time to breakout sessions and opportunities for questioning Include more time with experienced users and vendors Ensure that all voices are heard - avoid monopolisation (e.g., re: funding)
Routes Out	Increase focus on grant funding and financial support

	Provide a summary report re 'next steps' to include details of vendors, partnering, funding, networks and future actions
Vendors	Some vendors are too focused on the sale of proprietary systems Exploitation of opportunity rather than objective advice
Recruitment	Provision of greater detail and focus at recruitment stage requires improvement (to facilitate more informed decisions) Information is vague Initiate a pre-registration process to 'profile' businesses and thus ensure improved relevance
Relevance	Relevance of the programme for larger (and experienced and mature) SMEs is limited Relevance of the programme for micro-businesses is limited
Content	Provide a chance to see systems in action Map content to company size and experience 'Funnelling/streaming' at recruitment and provision of higher level content for experienced users Use a more visual format and further real-world examples
Platform	Adopt a more stable and commonly used platform (e.g., Teams or Zoom)

Table 3.5 Control Participants: Suggestions for Improvements

Peer Discussion and Advice	Include a more discursive element – addressing specific questions and providing tailored advice is critical Ensure access to peers Develop a post-intervention group or 'community'
Surveys	Surveying is too frequent Surveys are too demanding Questions can be confusing
Signposting and 'routes out'	Improve signposting to experts, vendors, advisors and access to funding Establish a 'lead-out programme' (and possibly a 'MC_L community') Link to 'Factory of the Future'
Recruitment	More detail on first contact to facilitate informed decisions re: participation Improve sorting and selection of recruits to ensure fit and relevance Publicise more widely and forcefully
Content	Further visualisations and cases Important to see demonstration of systems in action Further material re: finance, ROI and outcomes ('what changes') Ensure that content is 'shareable' within participant organisations
Relevance	Ensure improved relevance to micro and small SMEs Greater handholding required Reduce/unpack business jargon in presentations

**Surveys** - the surveys that are deployed within MC\_L (and that constitute an important element of the programme and experiment) are the target of the most frequent, and sometimes negative, commentary. The Baseline and Business Profile stages are both founded on an

extended (telephone) administered survey, and on-line surveys are deployed at the close of the CtG and GD stages. Several participants in both groups in the interviews provide a similar critique with respect to the length of the surveys and the time taken for their completion. So too, both request greater clarity in the questions and further explanation of the purpose of the surveys (though the latter is explained by facilitators in the events/communications, and the BP and CtG surveys are used to drive content in the subsequent step – something that is made clear at the time of delivery). Some elements of questioning relate directly to the experimental nature of the work and are designed to support the evaluation. The volume of questioning could be readily reduced in further delivery as some questions would no longer be required. Further, on the basis of learning from the programme (reported above and elsewhere), it would be possible to refigure and reduce the level of questioning overall. For example, much more is now known about the barriers that afflict aspirant adopters and greater focus in questioning is possible.

**Structure and Content** – suggestions here exhibit some commonality across groups, particularly with respect to efforts to provide enhanced visualisations and demonstrations, and further examples and case materials. Such requests appear sensible and inclusion of such materials should not present a major challenge. At group level, Treatment informants highlight the issue of the mapping/tailoring of content to firm size and experience. Whilst the suggestion is a helpful one, in practical terms it might only be actionable with significantly greater numbers of participants in sessions (or dedicated sessions for ‘streamed’ participant groups). Control group participants request the inclusion of further materials with respect to finance, funding, return on investment and outcomes. Whilst some material of this nature is currently in play, inclusion of further evidence/cases is not problematic. It is useful to note here that much discussion in Treatment sessions - especially in breakouts – focuses precisely on the themes of funding, value and RoI and these are subjects that feature heavily in P2P interactions.

**Signposting and ‘routes out’** – the interviews demonstrate that participants in both groups would wish to see an enhanced focus on post-participation ‘next steps’ in particular with respect to finding partners and accessing further advice and funding. Some Treatment participants suggest a ‘summary’ report, and Control participants allude to a ‘lead-out’ programme or the instigation of a ‘MC\_L community’ (the latter to facilitate shared experience and support). Again, action in relation to these suggestions is relatively straightforward.

**Recruitment** – there is some agreement across both groups that the recruitment process would benefit from some revision. In particular, the view is expressed widely that further information should be provided to participants in order that they might make a more informed decision with respect to the value of their involvement. At the experiment stage, the issue of recruitment was a thorny one: of course, there was a need to maximise participation for the RCT, however, it was also necessary to ensure that potential participants were not aware of the two-legged nature of the trial. As a result, recruiters were required to provide only vague messages about the nature of participation and what this might involve. Only upon registration was the Treatment or Control pathway revealed to the registrant. The problem of vague messaging would, of course, disappear with a shift to a single pathway (or choice of



pathways). Both groups also raise the issue of pre-participation profiling as a means of underpinning multiple journeys through the intervention on the basis of firm size, maturity or needs. As noted in the comments relating to 'structure' above, such a move would only become possible with significantly larger volumes of participants.

**Relevance** – the issue of relevance is raised in relation to firm size, with some participants suggesting that the intervention is not fully attuned to the needs of micro and very small businesses, and others that it is not aligned with the challenges and requirements of larger SMEs. Whilst suggestions here are again sensible and it is useful to ensure that materials and discussions in MC\_L fit with the needs of firms at both poles of the size spectrum, it was not possible to cater specifically for such companies within the experiment (given time and resources), and there is some evidence that some such firms rate themselves as significant beneficiaries of participation.

**Group specific suggestions: Treatment** – one of the most commonly expressed views amongst Treatment participants is that the breakout and discussion sessions are a particularly valuable element of the programme. Essentially, there is a plea that the P2P components of workshops should be extended to offer greater space for participants to discuss and share their requirements and concerns with experienced system users or providers. The opportunity to pose questions and to receive tailored advice is highly welcomed. Experimentation was undertaken with early cohorts and some (limited) post-event time was added in which participants were able to network with experts and facilitators. Another issue raised by Treatment participants relates to the role of vendors. Whilst many informants were appreciative of the expertise and advice offered by vendors, some were concerned that some of the latter slipped too easily into 'sales mode' and that their guidance might lack objectivity. The project organisers undertook on a number of occasions to remind vendor representatives of their responsibilities, though maintenance of objectivity is an issue that will require careful monitoring.

**Group specific suggestions: Control** – one of the most important contributions from Control informants (in the interview programme overall) relates to the issue of peer-to-peer communications and interaction. Although P2P was not an element that was included in the control leg of the experiment, a surprising number of Control participants suggested that the opportunity to communicate with peers (in the form of expert users of productivity systems, or suppliers of the same) would be highly valuable – indeed, some indicated that the opportunity to share ideas and to ask questions is crucial. Of the 25 participants in the group, nine raised the issue of P2P communications during interviews (sometimes in the guise of 'discussions' or 'chats' with users or vendors) and three used the term peer or peer-to-peer directly. These allusions to the benefits of peer interaction were, of course, entirely unprompted, and Control participants had no awareness of the Treatment leg of the programme or its P2P component. It may be that participants had experienced the value of peer interchange in previous programmes or in business scenarios more broadly, however, the strength of the expressed preference for a peer element in MC\_L was undeniably substantial.

### 3.6.8 Summary and Key Findings

The final interview programme has proven valuable in delivering nuance and detail that helps to frame and further unpack the quantitative elements of the study. It has also been useful in providing additional dimensions to the analysis and increased contextual richness and texture. As the quantitative study has facilitated detailed inter-group comparisons and the surfacing of high-resolution patterns within the experiment, the interview-based work has given voice to SME leaders and permits us to understand more clearly their aspirations and plans, and the constraints and challenges that confront them as they weigh the merits and costs of technology adoption. As noted in the introduction, the interviews were designed fundamentally to engage with the notion of ‘what happens’ in the post-participation period, and specifically, to (a) identify qualified moves to adoption, and (b) examine participants’ perceptions of the value and impact of the intervention. Given the interviewee’s generous and candid engagement, these aims have been amply fulfilled, and more, it has been possible to assemble a broad and multi-dimensional image of the factors that are shaping technology-related thinking and action in the North West’s manufacturing SME community. To close this section, we summarise below the lessons that can be drawn from the interview programme and related analysis.

*Engagement and recruitment* – 53 of 109 participants in MC\_L volunteered to take part in the interviews: whilst the initial target was not reached, this number is pleasing given the circumstances in play at the time of the exercise and much detailed evidence has been collected. Use of direct contacts from known individuals at the delivery institutions (EHU and AMRC) was significantly more successful in generating interview recruits than emails and calls from the evaluation team. Whilst the population is somewhat unbalanced, there is strong representation in the interviews from both Treatment (28) and Control (25) participants.

*Intention to adopt* – measuring and understanding post-participation developments is critical in the provision of a rounded evaluation. Fourteen (of fifty) firms were rated as ‘low’ in terms of intention to adopt, and twenty-eight high or very high. Treatment group firms were more likely than their Control counterparts to appear in the higher intent categories and the reverse is true for the lower categories. The average intention rating for the Treatment group is 3.76 (of 5) and that for the Control group is 3.36. However, these figures mask considerable complexity, and it is important to consider too the impact of issues such as existing technology usage, and the target of future investments (for example, initial purchase, training, systems integration or systems renewal).

*Realised adoption* – thirteen participants report that they have either adopted technologies since their engagement in MC\_L, or that they have qualified and advanced plans for near-term adoption. Of these, seven are Treatment and six Control group members. Seven companies indicate that their adoption was influenced directly by participation in MC\_L, and six that the influence was indirect (i.e., that MC\_L had been an important but not sole stimulus for adoption). Six adopter firms also indicate that they enjoyed further contacts with MC\_L partners (delivery agents or vendors) in the post-participation period, and two that they have

invested in systems recommended by MC\_L vendors. For some participants, MC\_L led directly to a successful Made Smarter application (the latter to part-fund adoption).

*MC\_L and 'influence'* – beyond the 'realised adopter' group, a significant number of interviewees alluded to the influence of the intervention with respect to consideration of and planning for adoption or other technology related actions. Fourteen participants in total, seven in each of the Treatment and Control groups, report that MC\_L has helped to shape their thinking or advanced their journey towards to adoption. For some, especially larger firms, MC\_L is ascribed a validatory or confirmatory role (i.e., it reinforces existing ideas and plans in relation to technology), though for others it is perceived as an important source of novel information, support and impetus as they prepare their organisations for the future, and likely technology adoption.

*Timescale for adoption* – in both the Treatment and Control groups, some businesses allude to the stretching of timescales (a result of operational considerations), and others report shrinkage as technology adoption assumes the status of priority issue. Firms in the higher 'intention' bands tend to exhibit shorter adoption timelines, and those in lower bands, longer timelines to adoption. Whilst the picture is complex, Treatment firms tend to report shorter timescales overall than their Control counterparts. Control participants are also more likely to report blockages to action and less confidence with respect to securing support for adoption.

*Barriers to adoption* – two-thirds of interviewees allude to either internal (company) or external (environmental) barriers to adoption. Internal factors include financial strictures (notably, growing costs), and caution and conservatism amongst company leaders. Comfort with existing systems is also cited as a blockage to adoption. Lack of confidence features prominently in discussions, with fear of making the 'wrong' decision re: system selection cited as a powerful obstacle to action. External barriers are connected closely with the impacts of recent major upheavals such as Brexit and Covid. The latter are perceived to have disrupted markets and supply chains, and to have required the diversion of management attention to issues of resilience (and in some cases business survival).

*Suggested improvements* – a number of participants in both groups draw attention to the surveys that either precede or are embedded in the sessions: these are perceived by some to be rather onerous. Whilst content is perceived widely to be of a high or very high quality, some interviewees call for tailoring of materials to firm size/stage of development, and others for the inclusion of further materials relating to issues of funding and return on investment. The latter is a particular concern for Control participants and it is notable that those in this group do not benefit from the peer discussions and the strong focus therein on issues of finance. Treatment participants are almost unanimously positive in relation to the value of peer-to-peer interaction, and some call for greater time to be dedicated to this throughout all sessions.

*Experience of MC\_L* – perceptions of the value and relevance of the intervention are generally very positive and 92% of interviewees from both groups report high or moderate levels of

satisfaction. Though a few large and very small SMEs express concerns re: targeting and relevance of the intervention, a majority of participants find the sessions to be well-focused and neatly attuned to their needs. Treatment participants applaud workshop organisation, structure and content, and are particularly positive in relation to the value of P2P interactions (the real world adoption and implementation experience of peers is perceived to provide crucial pointers and guides to action). Control participants are also positive with respect to session organisation, content and materials, and in particular the case studies included in the package. The latter are perceived to offer valuable information with respect to benefits of adoption, and the avoidance of pitfalls in implementation.

To conclude, the evaluation team notes that, whilst a highly demanding task in terms of time and resources, the inclusion of a final interview programme has added significantly to the reach and explanatory value of the evaluation. Whilst the quantitative components of the work provide a revealing picture, the availability of a large and rich qualitative evidence-base adds significant perspective and resolution to the image.

## 4. Section Four: Key Findings and Discussion

This final section of the report sets-out the key findings from the evaluation and first, addresses directly the project's primary and secondary research questions (on the basis of both quantitative and qualitative evidence). The section then moves-on to highlight further key messages that have emerged from the evaluation-focused investigations. To conclude, we consider some limitations of the evaluation (and the causes of these) and the generalisability of findings, focusing in particular, on the ways in which the project might be scaled-up for delivery to a broader audience and across a wider geography.

### 4.1 Research Questions

The project was designed to address four central questions, all founded on the hypothesis that the inclusion of a P2P support element for Treatment participants in the MC\_L intervention would provide greater benefits to this group than those available to their (non-P2P) Control counterparts. The premise was that these benefits, evident in improved and measurable outcomes, would be observable in terms of (a) 'intention to adopt' technologies, (b) confidence with respect to adoption, (c) timescales for investment, and (d) retention and progression within the intervention throughout its four stages.

*PRQ – 'intention to adopt'* - the experiment's primary research question focuses on the capacity of the intervention to influence 'intention to adopt' among participants. Our analysis indicates that 'intention' declines (albeit slightly) for both participant groups as they progress through the intervention. Whilst the inferential statistical analysis indicates no significant differences between T&C participants, the descriptive analysis suggests a slight initial decline for T participants with linearity thereafter, and a slightly deeper decline overall for C participants. This said, intention starts at a relatively high level in both groups and declines only marginally to remain at a high level at the completion of the intervention. Our qualitative evidence suggests that the decline is not surprising and that it reflects an intervention-induced shift for many participants from a position of 'unconscious incompetence' to one of conscious incompetence: as both T&C participants gain knowledge with respect to the demands and challenges of adoption, their more informed understanding can temper enthusiasm (though this moderating effect is limited). It also appears that the T approach delivers some benefits as participants with access to tailored advice in relation to their specific challenges demonstrate a relatively linear pattern with respect to intention. In sum, there is little difference between intention outcomes for T&C participants, though a minor P2P impact is evident and the intention decline is slightly more pronounced for the C group. We say more on the issues of intention to adopt and realised adoption below.

*SRQ – confidence with respect adoption* – the first of the secondary research question relates to issues of confidence with respect to adoption (and references issues such as securing appropriate supports and addressing company internal and external challenges). As with intention, inferential statistical tests show that differences between the T&C groups are not significant. However, we see a statistically proven increase in confidence for both groups

throughout the intervention, and also that a marked increase in confidence occurs after the BP stage. It is in its two later stages that the intervention introduces materials designed to address real-world adoption themes, and presents experience-based solutions for identified adoption and implementation challenges. Our qualitative evidence also speaks to growing confidence among participants as the intervention progresses and to the development of competence with respect to seeking appropriate adoption advice. The sequencing of content and activities within the intervention appears to aid substantially in building confidence for participants in both the T&C groups. We conclude that, whilst P2P impacts are not pronounced with respect to increasing confidence, the intervention has a substantial impact on adoption confidence across the group as a whole.

*SRQ – timescale for adoption* – there was an expectation at the inception of the project that (a) timescales for adoption of technologies would be reduced for firms that participate in the intervention, and (b) the reduction would be greater for the T group. Analysis of the quantitative data revealed that a reduction in timescale was proven. However, the data revealed also that the reduction was common across the T and C groups and that no statistically significant difference was in play. The reduction, albeit a small one overall, is of course positive, though additional materials from the qualitative research aided in lending greater clarity to the picture. In the post-participation phase, there was evidence of both shrinkage and expansion in timescales as firms engaged with the practicalities of moving to adoption: for some, emergent challenges had reined-in ambition with respect to early action, and for others, obstacles on the pathway had been cleared. However, participants across the board reported that the intervention had aided in delivering focus and perspective with respect to both adoption planning and the development of realistic timelines. So again, we find little impact of P2P mediation in the statistics, though there is good evidence of the effectiveness of the intervention in impacting positively on timescales (and related preparations) overall.

*SRQ – progression* – the issue of participant progression was a key one throughout the project and it was anticipated that the P2P element of the T delivery would add to this route's ability to retain its participants across the stages of the intervention. Such retention was perceived important as it should ensure both greater understanding of the benefits of technology adoption, and more thorough preparation for the challenges associated with planning and securing adoption supports. Whilst the inferential analysis again failed to show statistical significance in differences between the T and C groups, the descriptive statistics evidenced a different story. T participants were more likely to progress at every stage of the intervention, and by the final GD stage, there was a 12% difference in retention, with 57% of T firms completing the programme as opposed to 45% of their C counterparts. Whilst this is an observed trend only, it is a compelling one and the P2P element of the T route is implicated profoundly in the story. A majority of Treatment informants in the final interviews report that P2P is the most important factor in the intervention's design, and that the opportunity to benefit from the advice of experienced vendors and adopters offers very significant value. So, whilst not statistically proven, we observe a fairly strong impact of T participation (with its P2P component) on progression. Further, we would argue that progression counts: those

participants that are retained in the programme are the one's more likely to benefit in terms of confidence-building and developing realistic routes and timelines to adoption.

## 4.2 Additional Findings

Moving on from the research questions, we examine a range of connected and additional findings from the research, and consider their implications with respect to the success of the project and beyond into the design of future productivity-oriented programmes.

*Peer-to-Peer* – whilst discussed above in relation to research questions, the concept of P2P (especially in the context of awareness and adoption support programmes) is worthy of further consideration. Although there was little direct statistical support with respect to the situated or specific influence of P2P in MC\_L, the use of P2P approaches was perceived by both facilitators and participants to be the most important and impactful element of the Treatment pathway. Survey and interview responses throughout were highly positive with respect to P2P and those participants with access alluded to the importance of learning from experienced users, and the opportunity to secure tailored advice to specific questions across a range of issues (benefits, RoI, supports and funding, challenges, business case, implementation, organisational impacts etc.). Those participants that were less interactive and vocal in workshops were as enthusiastic as their more voluble counterparts and reported on the quality and depth of learning from ongoing conversations. One of the most widely requested improvements to workshops focused on the allocation of greater time to breakout (i.e., P2P led) sessions. Beyond T participants, a surprising number (almost a third) of interviewed C participants spoke of their desire/need to be able to communicate with expert providers or experienced technology users. P2P delivers clear advantages and adds real value to workshop-based interventions. It is not without resource implications, but for those within MC\_L the benefits would certainly outweigh the costs (even if those benefits only appeared in statistical terms in relation to the 'stickiness' of the Treatment route through the programme).

*Adoption of productivity enhancing technologies* – MC\_L appears to have been particularly successful in supporting its participants to progress (in an informed and planned manner) towards the adoption of relevant technologies. We were able to plot intention ratings across the stages of the intervention and noted that these were encouraging (if slightly and understandably reduced) at the close of delivery to each cohort. However, at Final Interview stage, it became evident that surprisingly large numbers of participants (13) had either progressed to 'realised adoption', were on the cusp of adoption, or had invested directly with a view to securing near-term purchase. Beyond these MC\_L 'inspired' adopters was a second tranche of 'influenced' participant companies (13) many of whom were well on the way to adoption with advanced and credible plans for near- or medium-term investment. Indeed, of the 53 firms interviewed, almost half had moved rapidly to adopt or to progress their plans for adoption. In value for money terms (in relation to promoting adoption) it appears that MC\_L can claim significant success.

*Satisfaction* – we report above on participant satisfaction rates in relation to the intervention, though it is worth reiterating here the level of appreciation demonstrated by those firms involved in the project. Satisfaction (in relation to experience and quality of session content and delivery) was strong throughout for both the T and C groups, though a little higher overall for T participants. Average scores for satisfaction derived from ‘in process’ surveys were 8.4 and 7.9 (on a 1-10 rating scale) for the T and C groups respectively. In the Final Interviews, although a different form of calculation was applied, 70% of respondents were positive in relation to experience, 22% reported moderate satisfaction, and only 7% were negative. Facilitators too reported very strong levels of satisfaction from their experience of taking part in the intervention and rated the quality of materials (and their impact on participants) highly. This is meaningful outcome as all facilitators are experienced educators and providers of business advice/consultancy with much experience of involvement in support programmes.

*Recruitment* – with respect to issues of process, it is worth noting here that some problems were experienced in relation to recruitment to MC\_L. Various approaches were trialled, from ‘network of network’ dissemination and direct contacts to contracting of business support agencies and commercial recruiters. Only two of these provided any real success: the networks approach was abandoned as was the effort to work with a regional Chamber. Direct contacts with targeted firms in the region – whilst labour intensive and demanding of a particular skill-set among those involved – proved highly successful. EHU, the progenitor of the approach was able to exceed its target. The recruitment of a specialist agency also provided significant success and represented a beneficial use of marketing budget. The lesson here is that recruitment, as a crucial factor in any RCT, requires significant forethought, proactivity, informed strategy selection, and ongoing monitoring and management.

*External environment* – related to the above, it is evident that MC\_L was launched against the backdrop of an extremely challenging environment. The Covid-19 pandemic and the impacts of Brexit impacted directly on recruitment and on the availability of firms that might have been attracted to participate in the programme. Whilst a set of contingencies that could hardly be anticipated, the entire MC\_L team moved very swiftly in its planning to ameliorate potential damage and, displaying impressive creativity, resilience and wit, was able to reconfigure the project for online delivery apparently without detriment to participants or outcomes.

### **4.3 Limitations (Evaluation)**

The most obvious limitation for the evaluation was the failure to achieve anticipated recruitment (though the reasons for the undershoot are fully evident and explained elsewhere). Power calculations would, of course, have been improved by the availability of a larger sample. So too, the target for Final Interviews (70-80) was not met, though 53 from a possible 109 is arguably a reasonable total. Further, it was possible to interview a large number of those that had progressed to the later stages of the intervention and were thus able to offer detailed insights. However, the opportunity to interview larger number of ‘early exit’ participants would have been valuable in terms of understanding the reasoning behind such withdrawal. Resources availability provided a further limitation: the project generated a very large amount



of data beyond that utilised for the evaluation. With greater resource and time dedicated to the evaluation, it would have been possible to undertake significant further mining and more sophisticated and extended forms of analysis. With very substantial further resource, it would be possible to compare our intervention groups with a similarly sized group of SMEs that had experienced no intervention whatsoever. This could be highly revealing.

#### 4.4 Potential for Scale-Up

It is perhaps notable that several participants in the Final Interview programme alluded to their desire to see MC\_L increased in scale and made more widely available to the SME community. Some also indicated that the project required a more high-profile marketing and publicity campaign to increase its visibility and build accessibility. Whilst it is gratifying to see such appreciation, it is also possible to discern some of the stimulus for such calls in the features of the intervention that were perceived to make MC\_L an attractive and successful offering. The content, structure, scheduling, facilitation and signposting elements of MC\_L were all reported as positive and beneficial aspects of the intervention. Some of the evolved features of MC\_L are set out below: the further development and marriage of these would arguably place MC\_L in a very strong position for roll-out to a wider territory.

- A strong, experience-tested and flexible platform is now in place. The ongoing planning work and subsequent refinement of various aspects of the programme imply that it can be easily adapted and rolled-out to a wider audience
- The content and delivery models are well-established and effective with proven ability to generate required outcomes
- Session structure, flow and scheduling are all neatly defined – they are also flexible with respect to adaptation to novel environments and demands
- Content is highly evolved and its pitching (for the middle mass of SMEs) is appropriate
- Approaches to facilitation have been tested and developed and a strong, participant-focused pedagogical philosophy is in place
- The use of tools such as surveys is sophisticated and the latter are deployed to drive development of cohort relevant content/materials (this works well in situ in bringing experienced issues/challenges to life)
- The deployment of P2P in sessions is much applauded by participants and has observed success in improving retention – there is some space for expansion and intensification of the use of P2P
- The project leadership team is a creative, resolute and responsive one – it has proven itself capable of accommodating to major contingencies
- Process and performance evaluation mechanisms and qualitative and quantitative data collection systems/tools are well-established and appear to be effective and productive: near real-time feedback can be fed into development and refinement efforts

- Alternative delivery models are in development – in a post-experiment environment, MCL can be offered in an optional route (asynchronous self-directed, or workshop with P2P) form, or in a blended form, where elements of both routes are combined
- Alternative scheduling and targeted delivery is possible
- Post-event 'routes-out', signposting and support systems are tried and tested and further development of these is in process
- The overall MC\_L platform constitutes a strong 'shell structure' – it should be possible to take the platform/shell and successfully substitute current content with novel materials (i.e., those associated with alternative subjects or fields)
- Various approaches to recruitment have been trialled and there is good evidence with respect to what works in recruitment. A programme based on direct contacts is a preferred approach

Whilst some further development work would be required to ensure successful expansion (along with consideration of a hub and spoke training and knowledge-transfer model wherein further delivery agents would be invited to undertake regional delivery), it may be posited that the current project team is well-placed and sufficiently experienced to undertake such work.

#### **4.5 Closing Comments**

It is evident that both arms of the MC\_L intervention have worked well and that they have delivered success in terms of advancing and securing the adoption of performance-enhancing technologies among an impressive number of NW SMEs. Whilst recruitment targets were not met, and there was little statistically significant difference in the success of the T and C routes, many elements of the project have been successful, certainly in terms of satisfying participants and delivering on the aims to increase intention to adopt, build SME confidence, and establish realistic timelines to adoption.

It is to be hoped that the evaluation programme has been successful too, both with respect to aiding the development and refinement of the project, and in providing data and evidence on which the value of MC\_L might be judged. The mixed methods approach deployed in the evaluation appears to have been beneficial, and we hope that we have been able to provide an overall analysis of the project that is both robust and detailed. The prosecution of the evaluation work has been highly enjoyable and the team acknowledges the valuable and generous inputs of all participants, and those colleagues in IGL and BEIS that have provided highly responsive and detailed support throughout.

Lawrence Green  
March 2022

## Appendix A

### Post Event Facilitator Feedback Survey

#### MC\_L Process Evaluation

##### A. Connect to Grow Event (26<sup>th</sup> January 2021)

1. Please rate your overall personal experience of involvement (using a 1-10 scale where 1 is least positive and 10 is most positive). Please place an X in the relevant box

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2. What is your general perception of how the event was received by participants (using a 1-10 scale where 1 is 'very poorly' and 10 is 'extremely well')? Please place an X in the relevant box

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

3. How would you rate the appropriateness of the content and overall approach for target participants (using a 1-10 scale where 1 is very weak and 10 is very strong)? Please place an X in the relevant box

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

4. What, in your view, went particularly well in the event?

(You may wish to comment here on scheduling, duration, content, approach to delivery/delivery style, organisation of different elements of the session, sequencing and flow of various elements, levels of interaction, pre-session materials, on-line surveying, technology platform, feedback from sessions)

Please add your text here:

5. What in your view was less positive about the event?

(again, you may wish to comment on scheduling, duration, content, approach to delivery/delivery style, organisation of different elements of the session, sequencing and flow of various elements, levels of interaction, pre-session materials, on-line surveying, technology platform, feedback from sessions)

Please add your text here:

6. What recommendations would you make re: changes that might improve or further focus future delivery of the session

Please add your text here:

7. Any further comments

Please add your text here:

## Appendix B

### Final Participant Interview Schedule

- (a) experience of the project, and  
(b) any further developments in interest in productivity-enhancing technologies.

- Your experience of taking part in Manufacturing Connect (any benefits or suggested improvements etc.)
- Your intentions with respect to the adoption (or non-adoption) of productivity-enhancing technologies and factors in your decisions

Picture of current position re: technology usage

3b. What technologies do you intend to adopt?

3c. When in such adoption likely? (Timescale) - months

3d. What plans are in place re: adoption (and to address barriers) and how advanced are these?  
(Confidence)

3e. Assessment of likelihood of adoption (Intent)

3f. Have any factors prevented/delayed adoption to date (and do any barriers remain in place)?  
(Confidence)

3g. What are the expected/intended impacts of proposed adoption?

3h. What factors have influenced your decision to move towards adoption?

3i. What (if any) of the elements of the MC\_L intervention have impacted on your decision to move towards adoption?  
(for example, peer approach where relevant, content and/or learning in sessions 1, 2 and 3)

3j. How would you rate your experience of engagement in MC\_L overall?

3k. What, if anything, would you wish to see changed in MC\_L to improve its relevance, impact or delivery?

3l. Would you be willing to take part in the development of a short case study in relation to your participation in MC\_L and the outcomes of the latter?