FINAL ANALYSIS & PROPOSED FRAMEWORK

Submission to the MIT REAP Programme

MIT REAP Leicestershire Team

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Introduction

Leicester and Leicestershire is home to over 42,000 registered businesses (490,000 in employment) covering a wide range of sectors. However, a high proportion of these businesses are embedded in low value-added sectors such as textiles, food and drink, and engineering supply chains. Leicestershire has an above national concentration of businesses in mature, profit-squeezed sectors such as manufacturing (LQ=1.59), motor trades (LQ=1.25), wholesale (LQ=1.27), retail (LQ=1.04), transport (LQ=1.32) and a low concentration of businesses in value-added sectors such as information and communication (LQ=0.67), and professional scientific and technical (LQ=0.80). This is perhaps surprising given the local dominance of its 3 universities (62,294 students, 10,222 staff).

Leicestershire is also marked by an above average composition of microbusinesses and freelancers, who are more likely to operate below the official VAT/Pay-As-You-Earn (PAYE) thresholds counted in the official business register (BRES) through the Office for National Statistics. For example, the BIS Business Population Estimates for 2017 indicate that around 90 per cent (89.8%) of businesses in Leicester and Leicestershire are micro (employing 0-9 people) compared to 84 per cent for the UK as a whole. Local and national research reveals that microbusinesses are particularly prevalent in textiles and fashion, design, arts, media, music, and IT sectors, which at the local level equates to an additional c20,000 businesses.

Table 1 - Leicestershire by Industry, with Locational Quotients (2018)

Industry	Businesses (with LQ)	Employment (with LQ)
Agriculture, Forestry and Fishing	1,820 (1.018)	6,000 (0.9417)
Mining, Quarrying and Utilities	185 (0.875)	11,000 (1.8948)
Manufacturing	3,375 (**1.597**)	60,000 (1.559)
Construction	4,630 (0.863)	22,000 (0.9415)
Motor Trades	1,495 (**1.259**)	11,000 (1.1979)
Wholesale	1,095 (**1.276**)	25,000 (1.239)
Retail	3,395 (1.047)	42,000 (0.9162)
Transport and Storage (incl Postal)	2,330 (**1.319**)	28,000 (1.1780)
Accommodation and Food Services	2,245 (0.9621)	30,000 (0.8200)
Information and Communication	2,545 (0.678)	13,000 (0.6102)
Financial and Insurance	2,145 (2.200)	11,000 (0.6614)
Property	1,725 (1.076)	7,000 (0.74169)
Professional, Scientific and Technical	6,125 (0.8090)	39,000 (0.8802)
Businesses Administration and Support Services	3,260 (0.8873)	42,000 (0.947)
Public Administration and Defence	155 (1.2532)	20,000 (0.0408)
Education	755 (0.0178)	47,000 (**1.1107**)
Health	1,710 (**1.0783**)	54,000 (0.8835)
Arts, Entertainment, Recreation & Other Services	2,365 (0.8781)	24,000 (0.0022)
Total	42,345	490,000

Source: NOMIS (BRES, 2017-18)

Over the past decade, Leicestershire's economy has grown steadily and is worth £24.5bn in GVA per annum. Productivity is above the regional average but below the national average. Leicester is famous for its vibrant, multi-cultural population and arts, while the city is surrounded by beautiful rural areas and distinctive towns that are important economic centres in their own right. The area's central location has made it the destination of choice for logistics companies, and is internationally connected through its East Midlands Airport. Segro Logistics Park East Midlands Gateway in the north of Leicestershire provides a 700 acre development, which integrates a 35 acre Strategic Rail Freight Interchange (SRFI), which acts as a national distribution hub. While the North-South transit routes have underpinned the accelerated growth of logistics and transport sectors in Leicestershire in recent years, poor East-West connectivity limits the movement of goods and people, and limits knowledge transfer further afield to the West Midlands and to growth areas of the Midlands Engine.

Leicestershire is home to three outstanding universities, which at any one time have 65,000 students (62,294). Graduate retention is currently 39.2 per cent (HESCU, 2018), the lowest retention rate of students of any UK area but is offset by Leicestershire's excellent transport links, which mean that many graduates live in the area but commute to jobs in London. Leicestershire universities are also particularly appealing for students throughout the Midlands, with students studying from home, rather than relocating to campus areas, and this also contributes to a lower than average retention rate.

The universities are also responsible for spinning out innovative new companies. Leicestershire has two Enterprise Zones covering four separate sites, as well as the UK's first designated Life Sciences Opportunities Zone at Charnwood Campus in Loughborough, adjacent to the University of Loughborough. Leicestershire is home to the MIRA Technology Park in Hinckley, a world leading automotive research and development park, home to international businesses in new transport technologies. The Loughborough University Science and Enterprise Park (LUSEP) is also one of the UK's largest enterprise zones, and home to 75 innovative businesses (2,200 employment) with clusters in advanced manufacturing, energy and low carbon, which connect with the University's research base. The designation of Charnwood Campus in Loughborough as the UK's first Life Sciences Opportunities Zone, as well as the establishment of the new Defence and National Rehabilitation Centre at Stanford Hall, also offers Leicester and Leicestershire the opportunity to develop a new bio-medical and pharma cluster that will develop new products and services for its ageing society as well as creating new knowledge-based jobs for the local economy.

Space Park Leicester is also set to become a world-leading hub for space and space-enabled industry and a globally leading centre for the translation of space research and Earth Observation data into commercial applications and services for businesses, researchers, and academia. £14m of funding for its new Manufacturing, Engineering and Earth Observation Research Centre (METEOR) will revolutionise how satellites are conceived, designed, and produced, and this provides not only significant support for Leicestershire's growing space economy but is an invaluable resource for tackling real world problems.

Leicestershire's universities plus enterprise zones, as well as its sites of high potential, act as significant assets and anchors for economic growth in the area. To deliver healthy growth and also to support the AI and Data and Low Carbon Grand Challenges, Leicester and Leicestershire will need to create more high value jobs in sectors such as low carbon, space and life sciences,

and to develop a skills base to NVQ level 4 in complementary areas. Leicester and Leicestershire's ageing population will also create new demands for technologies, products and services such as digital health, and create additional pressures for a suitably skilled workforce to fill vacancies in the economy through people retiring from the workforce.

At the same time, Leicestershire faces a range of economic challenges, which shape its economic plans and have informed our viewpoint on innovation and enterprise. Leicestershire's recent economic growth in service areas such as education, retail, and arts mask a growing productivity gap, as a result of mature, profit-squeezed sectors such as manufacturing. Many areas of Leicestershire's economy are characterised as low skill-low pay, where both skills and earnings are below the national average. The 2019 Index of Multiple Deprivation places Leicestershire in the worst 5 per cent of areas in the country, when measured on education and wealth-related indicators.

Prior to Covid, Leicestershire enjoyed stable and above national average, employment rates (76.9% in July-September 2019[1]) and below national average inactivity rates (19.2% compared to 20.8% for the UK[2]). However, Leicestershire's low income levels (£26,800 in Oadby and Wigston, and Melton compared to £37,400 for the UK) and its low household income (£29,600 compared £31,900 for England and Wales, and £22,600 in Leicester[3]) reflects Leicestershire's economic mix in low-wage sectors and the low productivity of its traditional economic base. This is reflected also in Leicestershire's per capita GVA figures of £22,920, which is considerably lower than the average for England (£27,060) and the UK (£26,584) but higher than the figure for the East Midlands (£21,502[4]). While GVA has been rising steadily since 2011, the productivity gap between Leicestershire and England has widened since 1997, and is explained to a large extent by Leicestershire's above average GVA share of manufacturing (food, textiles, paper, plastics, metal, machinery, equipment), construction, wholesale and retail, and transport, and the low wages in these sectors (Table 2).

[1] ONS (2019) Regional Labour Market Statistics, 2019
[2] ONS (2019) Labour Force Survey
[3] ONS (2019) Living Costs and Food Survey 2019
[4] Leicestershire Joint Strategic Needs Assessment 2018-21.

Table 2 - Leicestershire GVA by Industry (2018)

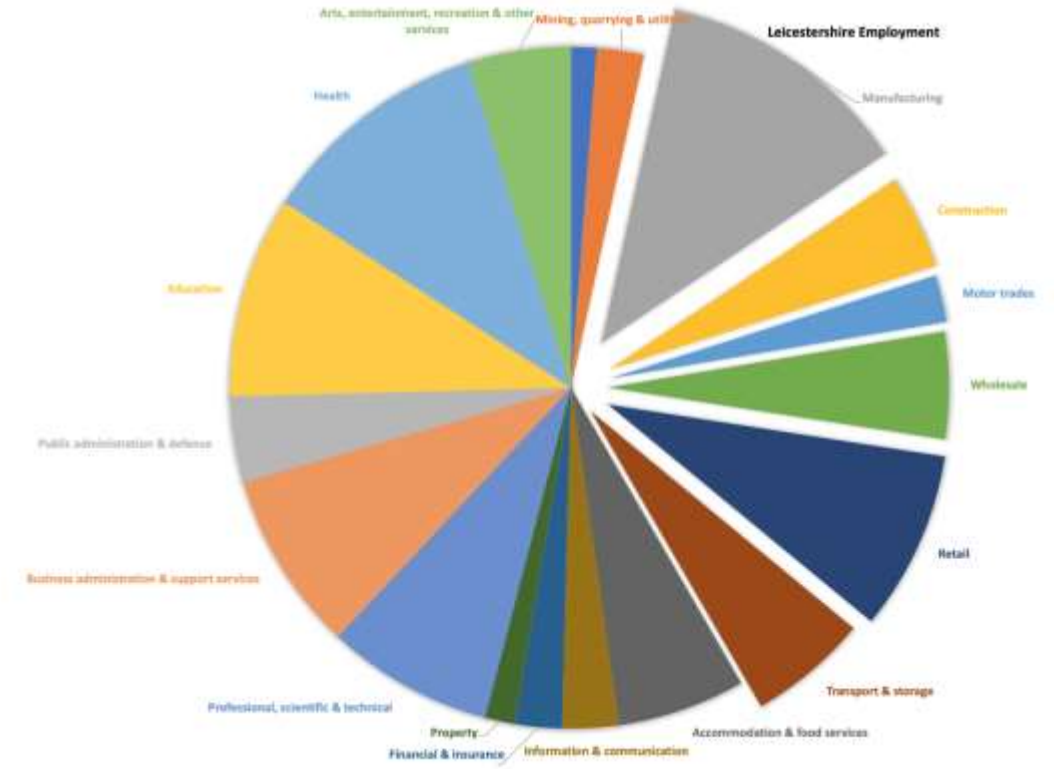
GVA by industry, Leicestershire, Rutland & Northamptonshire 2018 (£Millions)			
Industry	£Millions	GVA Share	England GVA Share
Agriculture, forestry and fishing	332	0.7	0.6
Mining and quarrying	179	0.4	0.1
Manufacture of food, beverages and tobacco	1,859	4.1	1.3
Manufacture of textiles, wearing apparel and leather	571	1.3	0.3
Manufacture of wood and paper products and printing	596	1.3	0.6
Manufacture of petroleum, chemicals and pharmaceuticals	437	1.0	1.5
Manufacture of rubber, plastic and non-metallic minerals	606	1.3	0.7
Manufacture of basic and fabricated metal products	623	1.4	1.1
Manufacture of computer, electronic and optical products	414	0.9	0.7
Manufacture of electrical equipment	139	0.3	0.2
Manufacture of machinery and equipment	857	1.9	0.8
Manufacture of transport equipment	354	0.8	1.5
Other manufacturing, repair and installation	387	0.8	0.8
Electricity, gas, steam and air-conditioning supply	1,531	3.4	1.3
Water supply; sewerage and waste management	485	1.1	1.2
Construction	3,202	7.0	6.1
Wholesale and retail trade; repair of motor vehicles	6,058	13.3	10.7
Transportation and storage	2,671	5.9	4.2
Accommodation and food service activities	943	2.1	2.8
Information and communication	1,394	3.1	7.6
Financial and insurance activities	1,768	3.9	7.3
Real estate activities	5,312	11.6	13.6
Professional, scientific and technical activities	2,599	5.7	8.2
Administrative and support service activities	2,486	5.4	5.6
Public administration and defence	1,672	3.7	4.4
Education	3,061	6.7	5.8
Human health and social work activities	3,299	7.2	7.2
Arts, entertainment and recreation	919	2.0	1.7
Other service activities	720	1.6	1.6
Activities of households	152	0.3	0.3
All industries	45,625	100.0	100.0

Source: ONS GVA by Industry, at Basic Prices (2018)

Leicestershire's Ecosystem

Leicestershire's *business* structure is dominated by Professional and Scientific, Education, and Health activities, which reflects a range of public-funded activities located in the Leicester conurbation, as well as the Arts and IT as significant sources of microenterprise in the city. Despite this, Leicestershire's *employment* profile is skewed heavily towards manufacturing, wholesale, transport, and retail, and in the public administrative areas of health and education, which all continue to employ large parts of the workforce. We have noted the employment base of Leicestershire as a primary driver of economic growth in the economy, which might be broadly recognisable as 'manufacturing' (including metal, textiles, food, engineering) and 'education and health' (including universities, research, NHS, and life science activities).

Figs 1-2, Business Register and Employment Survey, 2019 (Employment, Business Counts)



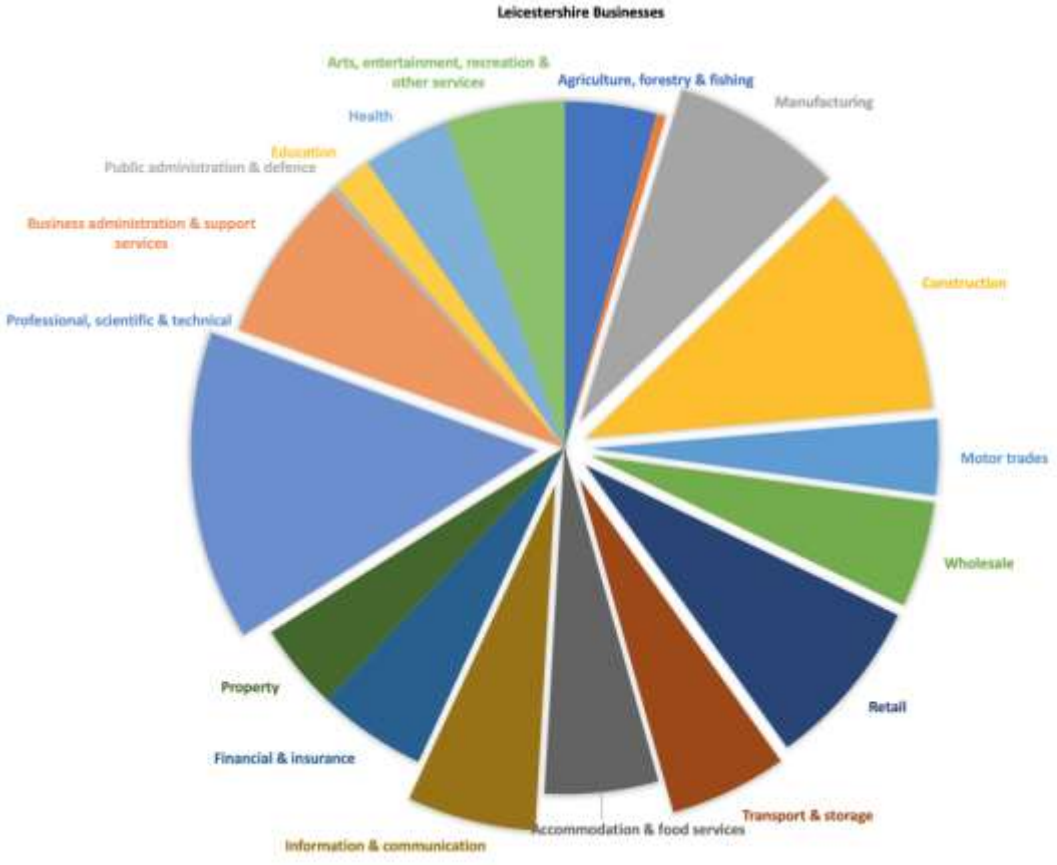


Table 3 - Leicestershire Manufacturing Sector (2018)

Manufacturing Employment Sector Share 2018				
Industry	**LLEP Area**	**LLEP Area % Share**	**England % Share**	**% Share Diff**
Mining support service activities	5	0.0	0.0	0.0
Manufacture of food products	13,000	2.7	1.2	1.5
Manufacture of beverages	900	0.2	0.1	0.1
Manufacture of tobacco products	10	0.0	0.0	0.0
Manufacture of textiles	2,250	0.5	0.2	0.3
Manufacture of wearing apparel	3,000	0.6	0.1	0.5
Manufacture of leather and related products	300	0.1	0.0	0.1
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	2,250	0.5	0.2	0.3
Manufacture of paper and paper products	3,000	0.6	0.2	0.4
Printing and reproduction of recorded media	2,250	0.5	0.4	0.1
Manufacture of coke and refined petroleum products	0	0.0	0.0	0.0
Manufacture of chemicals and chemical products	1,250	0.3	0.3	0.0
Manufacture of basic pharmaceutical products and pharmaceutical preparations	800	0.2	0.1	0.1
Manufacture of rubber and plastic products	3,500	0.7	0.5	0.2
Manufacture of other non-metallic mineral products	2,000	0.4	0.3	0.1
Manufacture of basic metals	1,000	0.2	0.2	0.0
Manufacture of fabricated metal products, except machinery and equipment	6,000	1.2	1.1	0.1
Manufacture of computer, electronic and optical products	3,000	0.6	0.4	0.2
Manufacture of electrical equipment	1,500	0.3	0.2	0.1
Manufacture of machinery and equipment	5,000	1.0	0.5	0.5
Manufacture of motor vehicles, trailers and semi-trailers	1,250	0.3	0.6	-0.3
Manufacture of other transport equipment	2,250	0.5	0.4	0.1
Manufacture of furniture	3,500	0.7	0.3	0.4
Other manufacturing	1,000	0.2	0.2	0.0
Column Total	**58,000**	**11.8**	**7.5**	**4.3**

	Largest sector employment
	Higher than average employment share

Source: ONS Business Registration and Employment Survey, 2019

Through the MIT REAP exercise, we have drawn on local stakeholder knowledge and De Montfort University's FLOKK platform to look in further detail at the structure, strengths, and workings of the ecosystem, with a particular focus on I-Cap and E-Cap capability components:

Education – we have noted the research excellence located in Leicestershire's higher education institutions, with 43 industry centres of excellence: 16 at Loughborough University; 16 at the University of Leicester; and 11 at De Montfort University. We have also noted the research excellence located within the Leicester Food Park (Food and Drink) and the MIRA Technology Park (Automotive), as well as the applied research present in the enterprise zones.

We have recorded £12.75m of turnover through Leicestershire's university spin-outs (both formal and with some HEP ownership) and the £110,000 turnover of graduate start-ups in 2017/18 (HESA Intellectual Property metrics). We have also noted the number of university patents filed in 2017/18 (53), the number filed by external partners naming a HE provider (353), number granted (105), and the cumulative patent portfolio (684) for Leicestershire.

Knowledge Transfer – We have identified 16 companies (SMEs) currently engaged in formal knowledge transfer with HE providers, or conducting national R&D with Innovate UK, amounting to 120 grants and knowledge transfer partnerships to the value of £25m. We recognise that this falls short of formal R&D expenditure in other regions and LEP areas.

Table 4 - Leicestershire R&D in Industry

LLEP Innovative companies (from an Innovate UK perspective)			
Company	**Size/Location**	**What is does**	**Grant/loan/KTP**
Microfresh	SME/Leicester	Antibacterial treatments, clothing, household good.	1 grant
M.Wright& Sons	SME/Quorn	Textile manufacturer	13 grants, £1.1m
Zeeko ltd	SME/Coalville	Intelligent robotic polishers	5 grants, £0.8m
Horiba Mira	Large/Nuneaton	Automotive testing/research	21 grants, £13.3m
Nemaura Pharmaceuticals	SME/Loughborough	Pharma	4 grants, £0.5m
Guidance Marine	SME/Blaby	Navigation, geolocation, digital	7 grants, £1m
Incus	Micro/Loughborough	Wearables, digital	1 grant, £0.3m
Ecotec Systems	SME/Lutterworth	Nanotechnology	1 grant, £0.5m
Earthsense systems	SME/Blaby	Digital, air quality monitoring	3 grants, £0.4m
Laser Optical Engineering	SME/Castle Donnington	Energy, nanotech	9 grants £1.2m
Nova Biopharma	SME/market Harborough	Lifesciences	1 grant £0.4m
Magna Parva	SME/Leicester	HVM, materials, space, food tech	11 grants, £0.9m
Alcuris	SME/Loughborough	Healthy ageing, digital	1 Grant, £0.2m
Base materials	SME/Blaby	HVM/Digital	12 grants, 1.5m
Haydale composites	SME/Loughborough	HVM, materials	31 grants, £3.7m
European Thermodynamis	SME/ Harborough	Intelligent Thermal Management	--

Source: Innovate UK

Infrastructure – We have noted the physical infrastructure of Leicestershire and its digital capability, as one aspects of I-cap. We note that while just 1 per cent coverage of full fibre in Leicester (8 per cent in Leicestershire) may limit the scope for some innovation, we note the opportunities arising from the current work of 'Full Fibre UK' to develop 99 per cent coverage of Leicester as part of Leicester's smart strategy. Further afield, we note the mixed coverage of 4G in Leicestershire, with 87 per cent coverage in Leicester but only 49 per cent in areas such as Melton, creating an unlevel playing field.

Knowledge Exchange and Cross-fertilisation - We have identified 28,000 attendees at HE events in 2017/18 and 10,000 attendees each year at Leicester Business Festival and Innovation Week, which provide core elements of Leicestershire's soft economic infrastructure (business support activities). Through Flokk we have identified other stakeholders e.g. the LCB Depot in Leicester, which provide supplementary platforms for knowledge exchange, and might be used as anchors for wider (cross-sectoral) activity in the future.

We have noted that while Leicestershire enjoys a high above national average rate of new business formation each year, as one aspect of its E-cap capability (3,200-3,400 PA), it is also affected by poor business survival (3,300-3,900 business deaths PA[5]). Leicester's 3-year survival rate for businesses (52.2%) is below the average for England (55.2%), and this acts as net loss to innovation and enterprise capability .

R&D – Data published by HMRC on R&D tax credits, reveals that the East Midlands underperforms in claiming and conducting R&D. While claims increased by 25 per cent from 2017-18 (3,120 claims on £180m tax relief), the average claim of £58,000 falls considerably short of those for London (£100,000). The 29 per cent increase from the manufacturing sector was welcomed but is eclipsed by claims from other sectors (e.g. doubling of higher value claims from the construction industry), which expose the weakness of Leicestershire's manufacturing sector in engaging with R&D and innovation.

Skills – Leicester and Leicestershire's skill levels at both NVQ2 and NVQ4 levels are below the national average, with a marked underperformance in the City of Leicester. 71.6 per cent of Leicestershire's population are skilled to NVQ2 level (GCSE level) compared to 75 per cent for England. 33.2 per cent of the population in Leicester and Leicestershire are skilled to NVQ 4 (higher education), compared to 40.2 per cent nationally.

While Leicester and Leicestershire also has an average profile towards trade apprenticeships (2.9% compared to 2.8% in England), this is lower for males aged 16-24 (4.3% compared to 4.5% in England), reflecting the low take-up of apprenticeships by young males in the City of Leicester (1.7%). We note also that only 42.2 per cent of all apprenticeships (2,920 in 2017/18) in Leicester and Leicestershire are in advanced areas, reflecting both a limited demand and supply of advanced skills in the economy, and representing an opportunity for further growth. We also accept that Leicester's high student population in e.g. postgraduate studies may distort the statistics of residents qualified to NVQ Level 3/4, which may be lower for permanent residents.

Drawing on FLOKK, we have noted some of the influential stakeholders operating in the ecosystem, which might be further mobilised to raise innovation capability, and tackle these different issues of knowledge transfer, R&D, and skills:

- *Education* – Loughborough University, University of Leicester, De Montfort University, Leicester College of Further Education, Midlands Enterprise Universities, Leicester Graduate Retention Scheme.

[5] ONS (2019) Business Demography, IDR

- *R&D* – Innovate UK, DASA, Space Park Leicester, Space Research and Innovation Network for Technology (SPRINT), ESA BIC (University of Leicester), Leicestershire Academic Health Partners, Leicester Precision Medicine Institute, Leicester Clinical Trials Unit, Biomedical Research Centre, Leicester Institute of Structural and Chemical Biology, Leicester Institute for Advanced Studies, Advanced Manufacturing Park Loughborough, Sport Park Loughborough, Usability Lab Leicester, Phoenix Interact Lab, Textiles Engineering and Materials Team (TEAM) at Leicester, DMU's Design Unit, DMU AI Institute, Pepsico R&D Unit.

- *Accelerator/Incubators* – Tech Start-Ups, Collaborate/Creative Leicestershire, Leicester Co-Working Project, Leicester Innovation centre, The Crucible at DMU, NatWest Business Builder Programme, DMU Works Enterprise Team, Impacting by Design (IBbD). Leicester Innovation Hub Start-Up/Leicester Innovation Accelerator, Leicester Life Sciences Accelerator (LIA), Space technology Application from Research (STAR), ESA Business Innovation centre, Leading to Grow Programme, Midlands Innovation Commercialisation of Research Accelerator (MICRA), Loughborough SME Competitiveness programme, Loughborough University Science and Enterprise Park (LUSEP), Advanced Innovation Centre (ATIC), Loughborough Sport Park, Loughborough University Incubator, Innovating Driven Entrepreneurship Academy (IDEA), The Studio at Loughborough, Santander Universities (University of Leicester and Loughborough University).

- *Maker/Hacker/Fab Labs and Specialised Spaces* – DOCK II, Phoenix Interactive Lab, Leicester Print Works, Graffwerk, Leicester Hackspace, Loughborough Materials Characterisation Centre, DMU Textiles Engineering and Materials (TEAM), DMU Cyber technology Centre, DMU AI Institute, DMU Institute of Creative Technologies, Creativity Centre at Space Park Leicester, LD3, STAR Additive Manufacturing facilities.

- *Co-Working Spaces* – LCB Depot, Phoenix Square, Makers Yard, Dock I & II, Friars Mill, StudionAme, Two Queens, Leicester Print Makers, Fibre Co-Working, De Montfort Co-Working Centre (and Co-worker Pro Scheme), Leicester Innovation Centre Business Units, Leicester Innovation Hub, Harborough Innovation Centre.

- *Connections and Events* – LLEP Business Gateway Growth Hub, Leicester Business Festival, Leicester Innovation Week, Leicester Innovation Accelerator, STAR Accelerator, Leicester Life Sciences Accelerator, Leicester Hackathons University of Leicester Start-up Café, DMU Textiles Hub, Creative Coffee/Creative Industries CIC, Create, Ideas and Beers (InnoHouse), Tech Start-Up Mondays, Leicester Urban Innovation Lab, TEDx Leicester, University of Leicester Research and Innovation Network for Technology (SPRINT), Leicester Business Voice, Innovation Fridays (University of Leicester), Leicestershire Live Innovation Awards, East Midlands Chamber events, LLEP Business Breakfasts, IoD events, Federation of Small Businesses Events,

Satellite Applications Catapult run events, Space Up event, NBV, princes Trust, Medilink, Horiba Mira, ICAEW, Make UK events, Food and Drink Forum.

- *Investment* – 2 Enterprise Zones (MIRA Technology Park, Loughborough University Science and Enterprise Park, Minerva Investor Group 7 (MIG 7), Leicester Science and Innovation Park, Charnwood Life Sciences, Leicester Life Sciences Accelerator), Midlands Innovation Universities, Midlands Enterprise University, East Midlands Gateway (Segro).

- *Corporations* – Pepsico Walkers, Caterpillar, Astrium, Lockhead Martin, IBM, NTT, Next, Joules, Dunhelm, Everards, Hastings Finance, Octopus Energy, PPL PRS, Sytner, the watches of Switzerland, Aggregate Industries, Samworth Brothers, Breedon Group, Ibstock PLC, Plastic Omnium, Available Car, Europ Car, Refresco Drinks, Flogas, Office Depot, Logson Group, Airline Investments (East Midlands Airport), Fisher Scientific, Topps Tiles, DHL, Pallex, Nicholls Colton Group, Rieke, Ceva, Barrett, Galiford.

- *Key Professional Services* – Law (BHW, Edward Hands & Lewis, Freeths, Shakespeare Martineau, Fosse Law, Freeths, Gateley, Grant Thornton, Howes Percival, Nelsons, Spearing Waite), Accountants (ICAEW, Carter & Co, Clear and Lane, Freeman & Co, Haines Watts, Hayes Farraar and Partners, KPMG, Lawson West, Newby Castleman, PKF Cooper Parry, Price Waterhouse Cooper, RSM, Pole Arnold, The Rowleys Partnership, Weightmans, Booby Dhanjal Wealth Management, Anantam Wealth Investments, Mattioli Woods, Brewin Dolphin), Architecture/Design (Architects LE1, Pick Everard, Allcock and Grieves, Brooker Flynn, Concept Zero, CPMG Architects, Design Studio, HSSP Architects, MSquare, SKM Architects, Watson Barry Architects,Williams Architects, Ash Sakula, BBLB, Bond Bryan, BPPR, Brimelow McSweeny, Duggan Morris, Feldmann Architects, Franklin Ellis, Hickman & Smith, HKR Architects, Holder Mathias, Hypostyle, Jane Duncan, KPW, Lathams, Leonard Design, Maber, Metz, Rayner, Walters, SKM Design), PR/Media (Champions, Leicestershire Live, Associate Events), IT (IBM, DMU Cyber Security Institute, University of Leicester Data Centre).

We have drawn further on FLOKK to examine networks, supply chains, and spaces among these stakeholders, which might provide fertile ground for further innovation and enterprise in Leicestershire. We note from Leicestershire's ecosystem depicted in Figure 3, the presence of naturally forming clusters, some sectoral, some coalescing across sub-sectors. We have detected the presence of clusters – agglomerations in traded and untraded connections – in:

1. Creative/Digital Media
2. Transport and Logistics
3. Sustainable Construction and Civil Engineering
4. Mature Manufacturing
5. Hi-Tech Manufacturing and Scientific Research
6. Immersive and Scientific Discovery

While we note the rich interconnections that exist within and between these distinct groups, we also note the relative absence of connections in other areas. For example, while we note the dense and diverse connections between creative and digital sectors and other areas of the ecosystem, we note the relative isolation of transport, construction, and some areas of manufacturing, from the wider core. This is not to say that these sectors or groups remain unconnected – and there is evidence of some strong connections between these sectors and universities – but that these are not always fully mobilised within the ecosystem or opened to other sectors. We have interpreted this as an opportunity to better connect different assets including existing business support activities of the ecosystem to achieve higher growth, while also recognising that absence of connections within the ecosystem might infer connections outside the ecosystem (as is the case with some scientific sectors, whose connections are in Germany or the USA). We have supplemented this snapshot of the ecosystem gained through Flokk, with the calculation of 'interoperability quotients', which confirm very high connections within some sectors such as construction/engineering, science/R&D, and education, and more limited connection across sectors (Table 5).

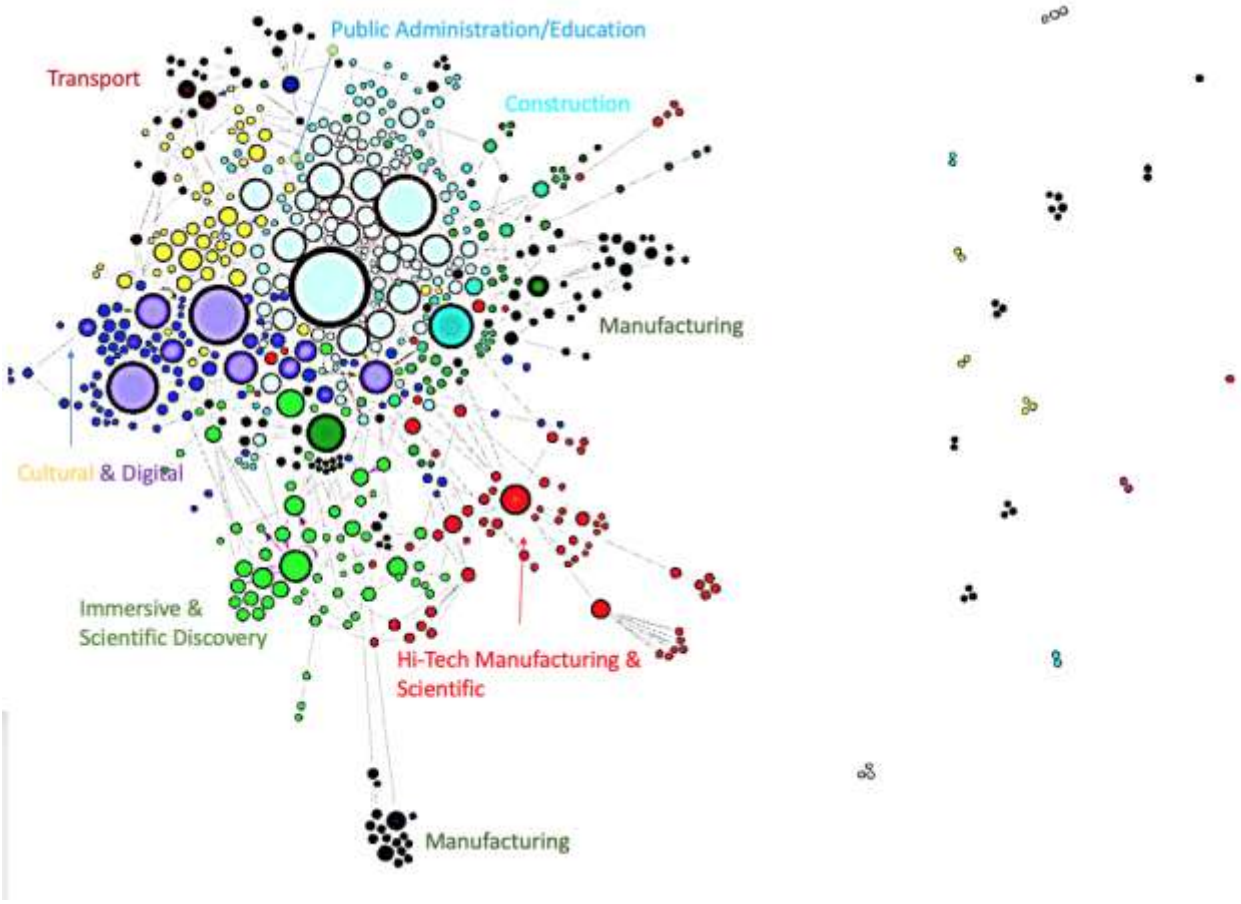
We have interpreted the rich intra-connections within some sectors positively but have also noted the untapped potential of cross-fertilisation of knowledge and skills between different sectors (leading to new and niche innovations), and the inherent benefits from value chains forming between sectors. While the FLOKK ecosystem is not exhaustive, it has provided useful insight into the spaces that connect sectors in Leicestershire, and where further connections with platforms and anchors might be positioned to encourage additional business support, knowledge exchange, leading to innovation.

Table 5 – Interoperability Quotients, Leicestershire (2019)

		Sector ii															
Sector i	*(Links from sector i, to sector ii)*	Creative Economy	Digital	Smart Economy	Construction/Engineering	Transport/Logistics	Manufacturing	Science/R&D	Services	Administration	Investment	Education	Health	Retail	Visitor Economy	Community & Third Sector	Sub-Total	IOQ2 (intra)
	Creative Economy	496	110	0	4	10	4	4	50	63	48	136	4	30	21	34	1014	1.37
	Digital	110	132	6	0	2	4	10	46	32	32	58	2	2	2	4	442	0.836
	Smart Economy	16	2	63	0	2	12	6	26	18	31	18	2	0	4	3	203	0.8292
	Construction/Engineering	4	2	6	43	0	6	0	6	16	0	4	0	2	2	2	93	1.295
	Transport/Logistics	16	2	0	8	51	4	2	26	17	0	2	0	4	8	4	144	0.992
	Manufacturing	16	12	2	9	8	81	26	10	8	20	16	4	6	8	6	232	0.9779
	Science/R&D	4	10	0	2	0	2	80	10	4	20	38	0	0	4	0	174	1.287
	Services	32	4	6	8	6	9	8	44	24	28	44	4	14	6	10	247	0.498
	Administration	12	2	0	0	2	2	8	6	31	0	47	2	4	14	0	130	0.6679
	Investment	2	18	0	0	2	2	10	0	4	4	0	0	4	0	8	54	0.207
	Education	62	20	14	0	2	6	4	22	44	8	142	0	2	8	21	355	1.1203
	Health	16	2	0	0	0	0	0	4	0	0	6	4	0	0	2	34	0.3295
	Retail	18	4	4	0	4	4	0	10	6	0	24	0	6	11	0	91	0.1846
	Visitor Economy	10	0	0	0	12	0	2	8	12	0	24	0	10	8	2	88	0.2546
	Community & Third Sector	32	2	4	0	0	0	0	4	28	4	44	6	4	18	71	217	0.91644
	Sub-total	846	322	90	74	101	136	160	272	307	195	603	28	88	114	167	3518	

Source: Data from FLOKK database

Fig 3 – The Leicestershire Ecosystem



Perceptions of Innovation and Enterprise

To supplement desk-based analysis, the MIT REAP Leicestershire Team conducted business surveys in June and July with 88 businesses. This has enabled us to examine innovation and enterprise capability from a business perspective, and to understand the broader effects and outcomes of Covid on innovation capacity and finance on the ground. A total of 90 businesses (88 valid completions) completed detailed reviews of their operations pre- and during Covid, which has provided further viewpoints on innovation and enterprise capability. We have analysed survey findings from different sector, business size, and age perspectives, to identify critical points of interest.

Innovation – 89 per cent of businesses who completed surveys confirmed localised innovation plans, with 31 per cent citing new business products and services and 24 per cent noting the role of IT/new technology in innovating business processes. 62 per cent of businesses also cited the importance of R&D over the next 12 months in responding to economic contraction as a result of Covid. The surveys revealed a disparity in the way businesses understand and apply the definition of innovation, which for some inferred 'new-to-the-world' products and services, and for others, new product lines or collaborations. We have taken all of these to mean innovation but have examined further in interviews, the distinction between radical and incremental innovation, and the factors that drive this.

Fig 4 – Covid Responses In Leicestershire Businesses

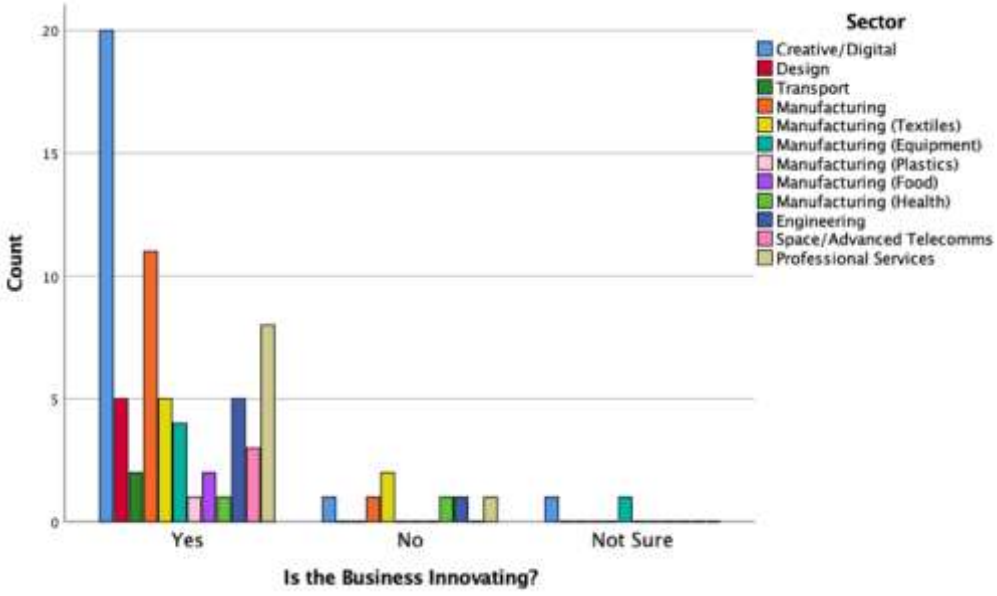


Fig 5 – Business Priorities over the Next 12 Months In Leicestershire

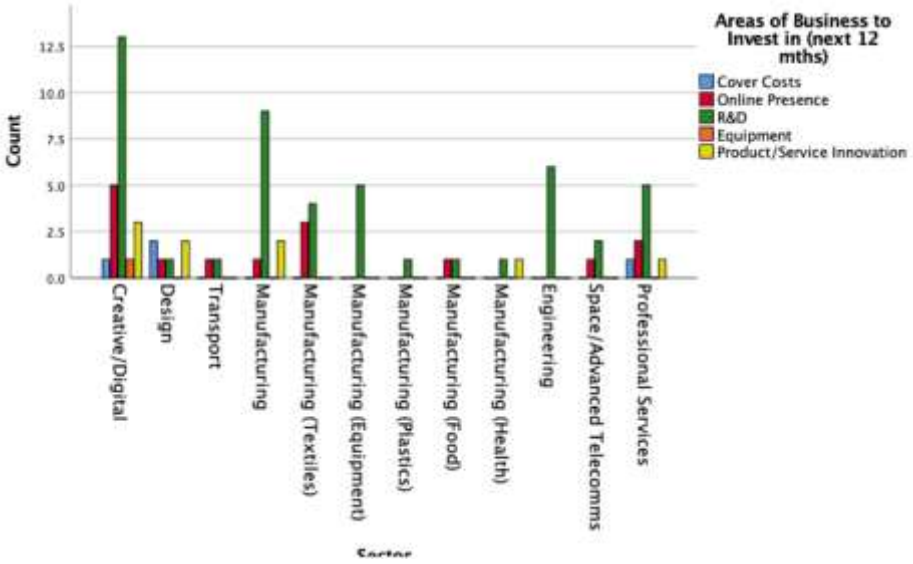


Fig 6 – View of Leicestershire Opportunities, By Sector

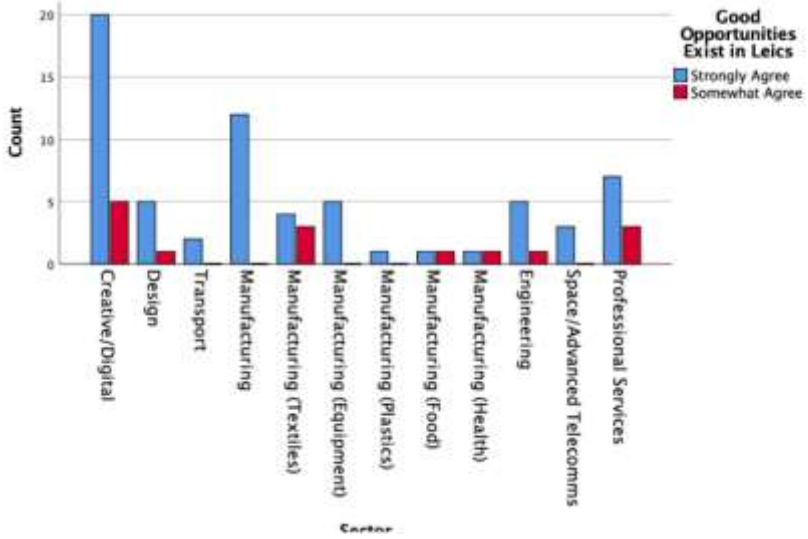


Fig 7 – Perceptions of Leicestershire's Innovation, By Business Age

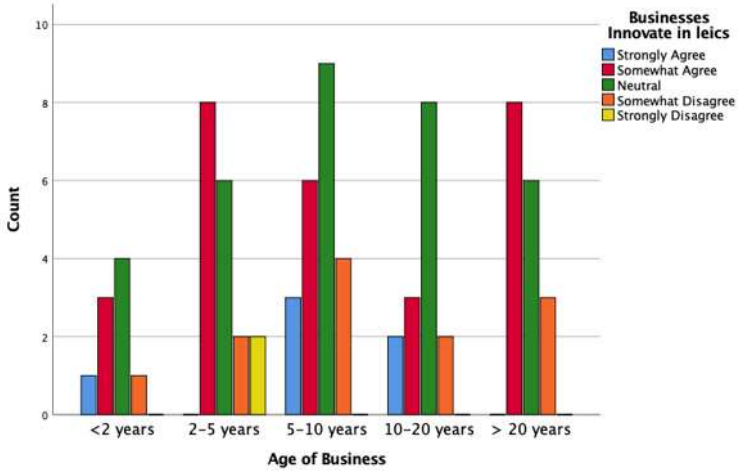
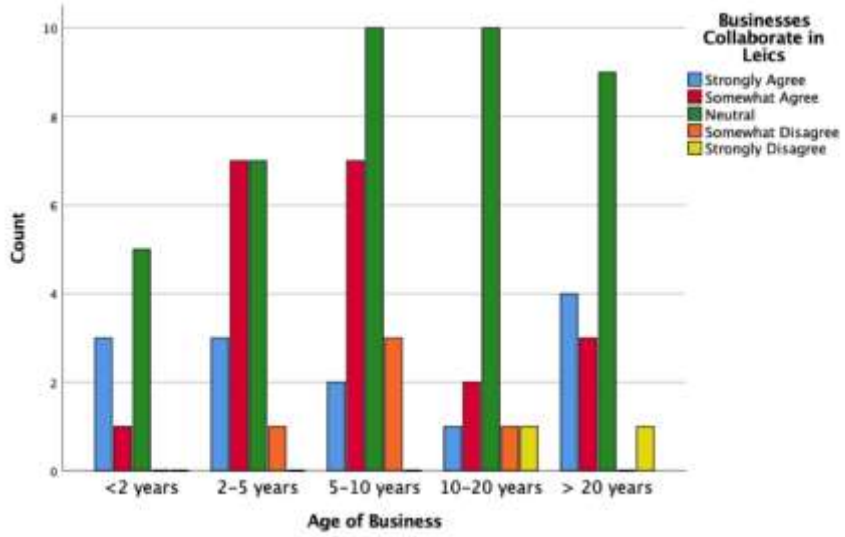


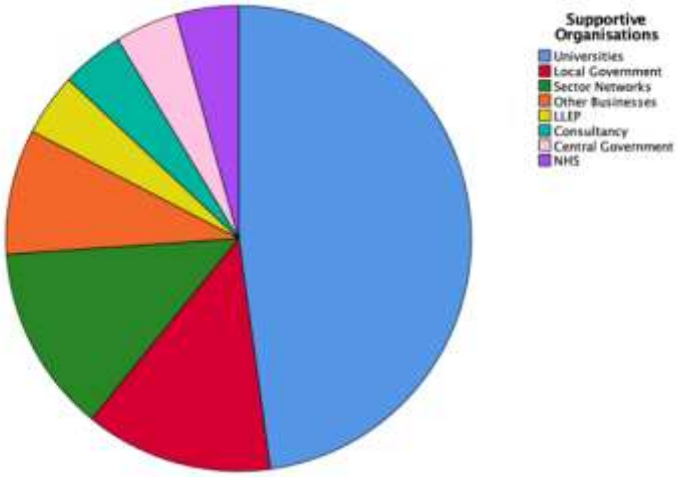
Fig 8 – Perceptions of Business Collaboration, by Business Age



While there was a broad and strong acknowledgement that Leicestershire provides excellent opportunities for business (Fig 6), there were weaker perceptions about current innovation in Leicestershire (Fig 7). This has been interpreted as a stronger presence of E-cap than I-cap. While there was wide acknowledgement of collaboration towards innovation in the ecosystem (Fig 8), we note a stronger predisposition towards collaboration with younger businesses, with mature SMEs less likely to collaborate and connect with others, including HE.

Similarly, while there was a variety of views as to the effectiveness of government, university and other provision in developing I-cap and E-cap, overall, there was wide support for universities, sector networks, and local government.

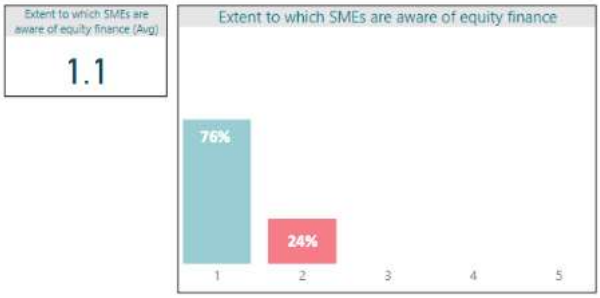
Fig 9 – Support Organisations in Leicestershire Ecosystem



Finance – A further 60 surveys were conducted with key finance intermediaries and stakeholders in Leicestershire (pre-Covid) to establish the demand and supply of financial activity, and the strength of Leicestershire's ecosystem from a financial viewpoint. 75 per cent of respondents to the finance survey, noted skills as a barrier to economic growth, and 50 per cent reported a low awareness of finance options in SMEs, needed to support growth. Three quarters of respondents to the finance survey also noted low awareness among SMEs of alternative (non-bank) lending, with innovating firms having low awareness of equity finance (fig 10). We have interpreted this as a need for industry-orientated communication (rather than from HE and Government), and a need for wider skillsets in finance and innovation.

Fig 10 – Equity Finance in the Leicestershire Ecosystem

To what extent do you think growing or innovating firms in this region are aware of equity finance – its features and characteristics?

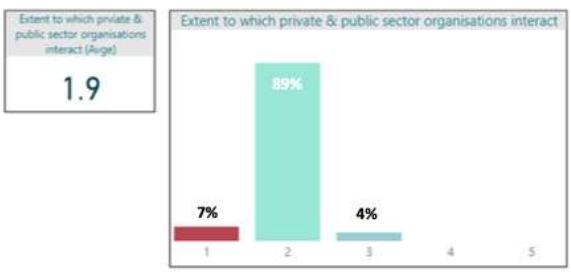


Respondents were asked to respond on a 1-5 scale, 1 being low awareness.

One interpretation is that demand for debt finance is limited by the current ambition and aspiration of the ecosystem's SMEs and a longstanding view, held since the 2007/2008 economic crisis, that debt is 'bad'. Whilst awareness of High Street lenders is high among SMEs, alternative lenders have yet to be embraced in the same manner as other regions. Demand for equity finance is still high amongst early stage businesses who are usually poorly prepared for such finance. For other businesses, equity finance is associated with 'losing control'; something that was reinforced during interviews, and as a result, there is a sense that Leicestershire is underperforming in using finance to drive innovation. The finance survey also revealed a low collaboration – communication - between private sector support organisations, and public sector organisations such as the LLEP/growth Hub, and Leicestershire universities (fig 11). WE have interpreted this as a need for more coordinated communication between stakeholders at the local level.

Fig 11 – Collaboration Between private Finance and Public Sectors in the Leicestershire Ecosystem

To what extent do you think the private sector support organisations in the region (accountants etc) engage with the public-sector organisations (LEPs/Growth Hubs/Innovate UK/universities)?



Respondents asked to respond on a 1-5 scale, 1 being lowest engagement.

Interviews – In-depth interviews were conducted with 13 SMEs to examine different perceptions of innovation, issues of finance, and factors that drive and inhibit I-cap in practice. The interviews enabled insights into aspects of innovation definitions, finance, skills, and collaboration, which are detailed further below.

- Defining innovation - While one interviewee interpreted innovation in the context of technology readiness levels (TRLs), others referred to innovation being present in the creative interpretation of client briefs and innovation being about 'doing something different' and also 'efficiently' e.g. "*Because each product is bespoke, there is a sense it is truly innovative but in reality it's based on years of experience of staff".* Another notes that '*while a product may have been produced before by the company, it is new – innovative – to the customer'*.

As one interviewee remarks:

> "*We do deal in novel (new-to-the-world) innovation but mostly, it's about innovative applied solutions. Being globally innovative is immensely challenging. We're only globally innovative in a few situations. The innovation is more about moving our clients on innovatively*".
>
> Efficiency savings through innovation were also cited as important to several SMEs, as a key part of creating space (time) to work on R&D as a conduit for further growth: e.g. "*Through efficiency savings, we are able to work on R&D projects that will showcase our abilities, and enable us to get to the next level*".

- Finance - Interviewees also noted finance as a barrier to further innovation noting e.g. "*There is inadequate funding support for the 'Valley of Death', which prevents commercial ideas being taken to market*", and "*Grants to file patents and commercialise IP would increase not only the value of the company but the value of the local economy*". Others noted the financial gaps in 'scale-up', especially for manufacturing SMEs:

> "*It costs a lot of money to set up a product business, and to bring something totally new to market when it involves both electronics and mechanical innovation. Bringing this to market without any kind of cash means that this would not happen. Saving resources by using the MTC [Midlands Technology Centre in Coventry] with their 50% EU funding was absolutely critical. We could literally do twice as much, and get twice as far, making it easier to then gain equity funding, which has given us a huge boost to the business*".
>
> *"In the UK, there is an equity gap. There are sources for small investment. If you're large then there is funding, but smaller and riskier businesses have very little to access. They need loans that can be turned into equity. Convertible loans turned into job creation (for instance via universities)".*
>
> *"In the next 12 months, greater focus will be on R&D in the company. We are great at technology development but not as agile at deriving value. …We don't spend as much as our competitors on R&D – to grow this needs to be done through partners, acquiring technologies and developing through projects."*

- Mentoring and Skills – Several interviewees noted the importance of mentoring in an ecosystem and also technical skills e.g. *"What holds innovation back is very skilled people – people will become unemployed in mechanical engineering, manufacturing, textiles etc. as a result of Covid, but these could be invaluable for areas such as cybersecurity. We need to create industry-orientated re-training programmes, to drive future economic growth."*

  "Unlike universities, MTC have experience of taking companies up the volume route (scale up) and have industry ready skills. Universities are a bit too theoretical and academic. IT all needs to be more applied. Good engineers, people who understand the digital world (machines that they use or websites), advanced manufacturing".

- Collaboration - was cited as an essential building block of innovation in Leicestershire e.g. "*To be successful now, one has to collaborate*":

  "There are very few problems where a single source of skills can solve something. It's about complex problems that require joint, integrative solutions. Funding the solutions ourselves, would reduce the breadth of our operations – we can innovate in more areas by sharing resources and risk."

- Knowledge Exchange Mindsets - Several successful SMEs referred to internal structures that provide conducive space for new ideas and/or horizon scanning e.g.

  "*We have an 'Innovation Forum' in-house which gets together once a year somewhere to pick up intelligence, talk about the developments. Technical meetings take place to consider R&D and for blue sky thinking.".*

  Others, referred to informal arrangements that allowed for rapid raising of ideas and the agility needed to innovate in a competitive market e.g.

  "The entire company is innovative. It's a mindset. Everyone is creative and we want everyone to be as disruptive as possible in solving client and future problems. We operate a flat structure and operate at pace. This allows for agile thinking, which with removal of red tape, empowerment of people, and financial incentives drives a constant stream of ideas."

Developing Innovation through the Leicestershire Ecosystem

What has been gleaned from an I-Cap and E-cap analysis of the Leicestershire ecosystem is:

- An open and emerging ecosystem.
- Distinct growth assets and the presence of three universities, each with underpinning key strengths and pathways to impact in industry (Fig 12).
- Diverse portfolio of business interests, by sector, size, and maturity.
- Strong evidence of innovation across a wide sectoral base.
- Advanced scientific innovation feeding into space science, health and life sciences, sports, and AI.

We have identified existing barriers (and challenges) that prevent the Leicestershire economy from developing to its full potential:

- Tackling low productivity and low innovation in some sectors - Through desk-based surveys, surveys and interviews, we have identified innovation gaps in manufacturing, retail, logistics and transport sectors.
- Converting E-cap to I-cap – we have identified high levels of entrepreneurship throughout the Leicestershire's ecosystem and above-average business start-up rates, with a need to address low business survival rates, business scale-up, and to channel entrepreneurial behaviour into an innovation mindset.
- Universities act as significant mentors for start-ups, and conduits for specialist knowledge diffusion and IP commercialisation but more can be done to address low connections between HE and mature, profit-squeezed manufacturing.
- Strong sector-based connections, with fewer connections across sectors, revealing a risk of lock-in of skills and resources, and latent innovation potential from niche crossovers.
- Mixed take-up of finance for innovation, and widespread perceptions that prevent take-up of finance for economic growth.
- Diverse spaces for knowledge transfer and technology diffusion, which remain untapped by some mature businesses and sectors.

Fig 12 –The Leicestershire Ecosystem

Leicestershire stakeholders agree that inclusive economic growth that benefits all and develops assets to their full potential will be beneficial in driving Leicestershire's economy and levelling-up performance. Levelling-up in the Leicestershire context is taken to mean a need to level up with London but to some extent, also with the Northern Powerhouse. Thus, we recognise a need to rebalance Leicestershire's economy by tackling those sectors and places 'left behind' by economic and social deprivation, under-resourcing, and under-performing. The emphasis being on the end goals of employment, income, and wellbeing, but 'levelling-up' being visible in inward investment, research and development, and public spending tied to economic growth.

The Leicester and Leicestershire Enterprise Partnership through its preparation of a Local Industrial Strategy (LIS) identified previously the broad challenges of local under-investment in R&D as a percentage of GVA (consistent with national research), a need for further commercialisation of ideas into new products and services, and a need for improved knowledge transfer through enhanced networking. Leicestershire, like the Midlands more generally, is an area of low private sector and low public sector R&D; securing just 11 per cent of the R&D investment of London (Eurostat, 2016) and falling short of the targets set nationally by Government (2.4 per cent of GDP). However rebalancing the UK's R&D landscape requires a broad capacity for research, which involves not only institutions with well-equipped facilities but also a supply of skilled people, and appetite for knowledge transfer and commercialisation of ideas, which has been revealed through analysis of the ecosystem.

Leicestershire's draft local industrial strategy and the MIT REAP exercise has acknowledged the excellence of Leicestershire's three universities and the affiliated Space Park in Leicester, SportPark at Loughborough University, and De Montfort University's excellence in AI and cybersecurity as significant opportunities. They have also recognised the research capability through Leicestershire's two enterprise zones, including the Life Sciences Opportunities Zone at Charnwood Campus, Loughborough, which collectively provides a leading science and research community, and Horiba Mira at Hinckley. Horiba Mira provides a base for advanced manufacturing research on autonomous vehicles with crossovers into AI and cybersecurity research, and which provides the largest proving ground in Europe.

The draft industrial strategy and the MIT REAP exercise has exposed the additional challenges presented by Leicestershire's low-skilled workforce and low wage economy, together with a high concentration of micro businesses and mature manufacturing SMEs, which limits the capacity for knowledge-intensive growth. Leicestershire's manufacturing sector performs 11 per cent below the national average, with large textiles and furniture manufacturers performing 30 per cent lower. The LIS in particular identified a lack of investment in capital, training, innovation, and adoption of digital technologies in these manufacturing sectors, as factors, which hold back local growth; something that has been echoed through the MIT REAP exercise.

Against this backdrop, the analysis of Leicestershire's ecosystem using MIT's I-Cap and E-Cap framework has been invaluable in identifying 5 key challenges, which have informed an action plan for the MIT REAP Leicestershire Team:

1. *I-Cap and E-Cap* – We find replete examples of businesses on the ground using 'innovation' and 'entrepreneurship' interchangeably. While some businesses engage with innovation exclusively in terms of technical novelty resulting in new IP and products (radical innovation), we find that the majority of companies identify with incremental innovation embedded in new processes, and/or new rounds of applied problem-solving. Taken together, we note a need for further developing innovation skillsets across the ecosystem, to deal with the different interpretations and practices involved in innovation, all of which we recognise as beneficial in driving growth.

2. *Spaces for knowledge exchange* – We have discovered common ground in the different accounts of innovation in practice, which are predicated on informal and open spaces within and external to a business, which are used for ideation or horizon-scanning activities. Several survey respondents and interviewees have explicitly reduced innovation to the process of 'collaborating', and framed innovation in relational terms tied to collaborative knowledge and technology exchange, and the spaces needed to facilitate this. We have noted that while some parts of the ecosystem have good access to spaces either in-house or through sector networks, microbusinesses, mature SMEs, and underdeveloped sectors are less likely to benefit from the same arrangements. Spaces confer benefits by driving opportunities for collaboration, knowledge exchange, pooling of resources, or by providing opportunity for ideation, while overarching spaces allow for niche areas of cross-sector innovation or applied problem solving.

3. *Finance to encourage risk and ideas* – We find that innovation in the form of novel products or ideas require substantial financial support to develop and to commercialise, and that these are inherently cost-prohibitive for smaller businesses, including graduates from Leicestershire's universities. We have therefore identified a need to de-risk the commercialisation of new ideas, to scale-up innovation in the ecosystem, and to offer further resources, which mitigate the costs of commercialisation.

4. *Mentoring* – Drawing on best practice within the ecosystem, we note the importance of mentoring in developing business cultures and individual mindsets conducive to innovation. We have translated this as a need to extend existing business support activities to provide widespread mentoring and development activities, through open networks and on a one-to-one basis, as well as through an innovation academy.

5. *Skills* – Reflecting on the residual skill levels of the Leicestershire workforce and the specialist skills of growth areas (space, health, sports, digital), we have noted a need for widespread sector retraining to meet future skill needs in our growth clusters, and in order to develop an absorptive capacity for wider knowledge transfer and innovation.

Leicestershire's Barriers to Economic Growth

Leicestershire's manufacturing base – involving sectors from textiles production, metal fabrication, food processing, chemicals, and electronics – is well developed in Leicestershire, and embedded in intricate supply chains. Manufacturing remains highly significant to Leicestershire's economy, which at any one-time accounts for c.6,000 businesses and contributes £4.7-5bn to the economy. However, local manufacturing enjoys fewer ties with HE; something that has been confirmed through the MIT REAP exercise. While there are notable examples of successful knowledge transfer between university and manufacturing, this is not the picture overall. There are absences in the ties between universities and some leading manufacturing companies, which together with an underperforming mid-sized manufacturing and retail sector (£2.1bn), represents latent potential for economic growth. Leicestershire's (LLEP) application to MIT REAP focused on raising the productivity of this manufacturing and SME base, as the key mechanism for levelling up Leicestershire's economy. At the heart of our plan then is to position knowledge, dynamism and global reach within our manufacturing and mature SME sectors, within a wider landscape of research excellence, to develop rapid innovation, leading to job growth.

The Proposition: Beacons and Bootstraps

We recognise that sustained growth will come from harnessing the exciting opportunities from Leicestershire's science and technology community and leveraging HPOs (High Potential Opportunities identified by the DIT), through investment and supply chains, which enable companies to expand their market and their innovative potential. Equally, that balanced growth will emerge from targeted support at a currently underdeveloped manufacturing sector, to raise aspiration and potential as well as the capacity for innovation, and which might drive growth through existing and emerging clusters and associated value chains. If developed to their full potential as strong, innovative companies and sectors, it is a reasonable supposition that Leicestershire's economy could be grown by up to 10 per cent within a decade.

The vision is to grow Leicestershire's economy by 5-10% above the national average, and to create a high-performing and inclusive economy, in which advanced and innovative manufacturing plays a strong role within a thriving R&D community, developed around existing and emerging clusters. Such a vision requires significant investment and upskilling, as well as nuanced support to build linkages and develop capacity with existing beacons, that act as catalysts for growth. This is illustrated in our 'postcard from the future' on Beacons and Bootstraps. The Beacons and Bootstraps concept visualises the two types of entrepreneurship in the area and the two parallel types of support needed to support capacity for entrepreneurships and innovation.

Fig 13 –Postcard from the Future

Our vision is to combine an approach that seeks to upscale productivity and enhance the existing infrastructure 'pulling the manufacturing base by its bootstraps' through the introduction of Industry 4.0 capabilities and while driving a culture of innovation, supported by our distinctive beacons in space, life sciences, sport, health, AI and cybersecurity. Significant investment has already been committed in these areas, supported by world-leading expertise and research, with their potential recognised by the Department of International Trade (DIT). They provide opportunities for new growth, new investment possibilities, and new value chains that not only open up markets but set out a roadmap for longer-term growth in the region, through which manufacturing and mature sectors might develop to their full potential. We propose a mixed mode strategy tackling skills and mentoring, investment, value creation, market capture, networking, knowledge exchange, commercialisation, and with advanced services and spaces to drive innovation.

Bootstrap support would extend the reach and depth of existing business provision to focus support around better use of assets, skills, and spaces, which allow the market to work more effectively:

(i) *Leicestershire Assets* (Supply) – We recognise that investment has taken place in Leicestershire, to support research excellence in Space, Health, and Sports, and also recognise the excellence in Digital, as well as the financial assets through designated enterprise zones and parks. These provide core assets that might be enhanced to realise higher economic growth and innovation for manufacturing. We see this as mutually beneficial. Opening up specialised assets in niche areas can support manufacturing innovation, leading to job growth in emerging or future sectors. At the same time, a growing, innovative manufacturing sector can support the development of Leicestershire's space, health, and sports sectors; helping to develop future critical mass, cascading R&D, and targeting investment potential.

(ii) *Skill Gaps* – Recognising that whether embedded in people or advanced technologies, knowledge rather than entrepreneurship increasingly drives economic growth. Knowledge-based innovations are proliferating and new sectors are emerging (as well as old ones being transformed) through new AI and 'big data' capability, paving the way for intelligent landscapes and new smart sectors. The economic landscape has also become much more dynamic with competitiveness tied to flexible production and rapid adaption. We recognise that entire networks of businesses, institutions, and stakeholders need to be brought into play to redeploy assets and mobilise knowledge bases towards next generation thinking and agile production. We also recognise the need for extensive re-skilling programmes in manufacturing areas in need of Industry 4.0 to compete in a quickly moving marketplace, and digital-led commerce and innovation. At the same time, we recognise that the outmoded skills in older, declining sectors can be redeployed for emerging areas e.g. sensor tracking, nano-production, digital health, cyber, and block-chain, that reinforce our beacons.

(iii) *Brokering (Demand)* – We recognise that while Leicestershire's existing business support infrastructure and its universities have forged excellent links with businesses, that these typically channel support to niche areas of research, or offer generic support to start-ups and scale-ups, whereas more specialist provision is

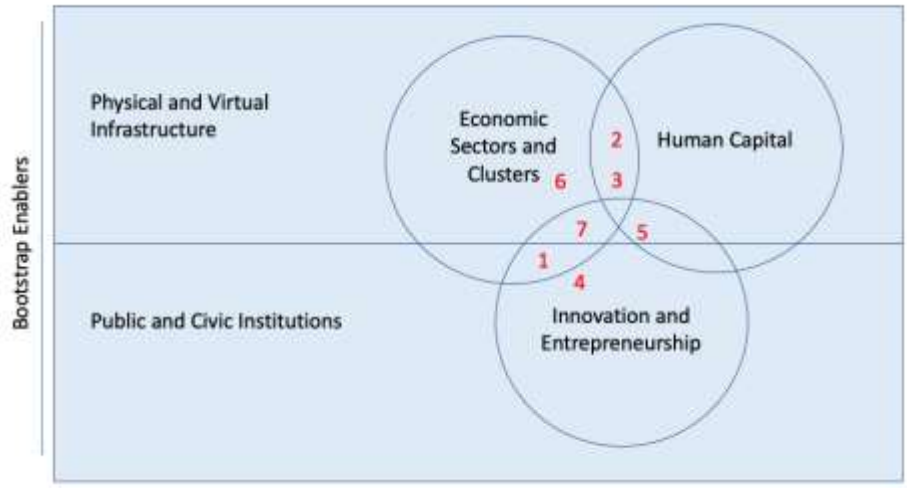
needed to transition mature manufacturing sectors to beacon activity. We acknowledge the benefits of current financial arrangements that provide supply-side business support but also recognise the opportunity costs to the Leicestershire and to some extent, regional economy, in our limited arrangements for manufacturing and ancillary sectors. Supporting a wholescale shift towards agile, innovative manufacturing, in which businesses trade on economies of scope, rather than economies of scale, requires specialist support and also brokering, to create the right spaces and the offer, which will lead to real impact. Diffusion from centres of excellence represents a long-term direction of travel for Leicestershire whereas rapid levelling up through manufacturing growth requires a more relevant business offer. Here, we recognise the benefits accrued from interface provision in other regions, based on brokering work with industry, which brings together the demand- and supply-side aspects of technology and knowledge, using an industry-relevant language and business model (*e.g. the MTC in the West Midlands, and Horiba Mira*). Industry-led business support, directed alongside the current HE and public business support offer, has the potential to gain traction with hard-to-reach manufacturing sectors, and to encourage the cultural mindset needed for rapid growth. A portfolio approach to business support in Leicestershire then – through HE, the LLEP, and through industry brokers, as the interface between the main stakeholders – would provide a sound basis for building higher rates of economic and job growth through manufacturing, while also servicing a variety of other business needs.

Fig 14 – Beacons and Bootstraps in Leicestershire

Beacons and Bootstraps in Action

Bootstrap support might focus on the market levers that drive economic growth through raised manufacturing potential, drawing on the I-Cap and E-Cap components of human capital, funding, infrastructure, demand, and culture:

Fig 15 – Bootstrap Enablers in Leicestershire



1. *Accelerators* – Development of accelerators, to channel SME innovation towards sector challenges or emerging areas of investment. We envisage accelerators involving a wide-range of actors including industry bodies, regional and national business champions, the LLEP Growth Hub, links to Government and agencies such as UKRI, with potential support from universities, centres of excellence, and corporate sectors.

2. *Re-training and New Skills Programmes* – Development of large-scale retraining programmes for manufacturing workforces, both to enhance manufacturing capabilities towards Industry 4.0 and develop absorptive capacity for existing research excellence, as well as training for future skill needs (AI, Blockchain, robotisation, green, e-commerce).

3. *New spaces for knowledge exchange* – Creation of new spaces for knowledge exchange, supporting cross-fertilisation of skills (from high R&D to low R&D sectors), which stretch beyond campuses and civic institutions to off-campus mixed spaces, new networks, and use of existing and new infrastructure (e.g. the well-connected creative and digital industries). We also recognise the advantages of wider application of specialist facilities e.g. the establishment of specialist high tech manufacturing and demonstration facilities such as the proposed Low Cost Access to Space (LOCAS), satellite manufacturing factory at Space Park Leicester, to support industry manufacture of smaller satellites; technology demonstration facilities to enable the adoption and knowledge diffusion to aid productivity.

4. *Interface campuses* – Development of infrastructure for isolated manufacturing sectors such as an innovation academy, situated off-campus but connecting HE research excellence with real life business needs (e.g. problem solving, prototyping), supported

by dedicated resources for finance and expertise to drive sector innovation (e.g. automation, new technologies).

5. *New maker spaces* – Provision of new maker spaces to address gaps in provision in Leicestershire and support manufacturing businesses to engage in proof of concept activity across the TRLs, to commercialise, prototype, and de-risk innovation, to raise patent portfolios, drive innovation activity, and support new cultures of innovation in mature sub-sectors.

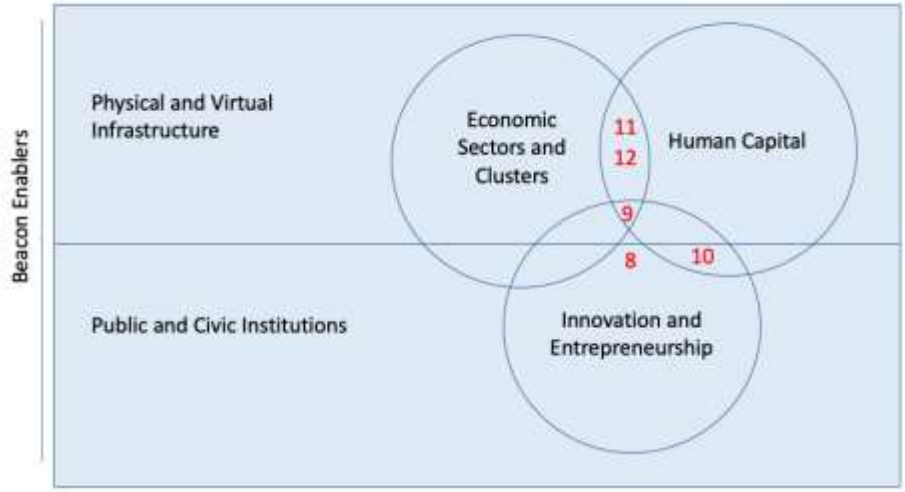
6. *New Complementary Clusters* – Encourage the growth of new cluster activities at the intersection between existing Beacon activity and R&D, and enhanced manufacturing capabilities, that reposition the manufacturing sector.

7. *Capital Support* – Encourage local technology procurement providing an economic catalyst for innovation through technology appropriation, and provision of support for capital stimulus for e.g. equipment, aimed at SME upscaling and growth.

Table 6 – Identified Issues and Action for E-Cap Capability

Issues for E-Cap Sectors ➔	Evidence	➔ Proposed Action
Low productivity and innovation of mature, declining sectors.	Survey LIS	Targeted support through a bootstraps programme to address underperforming sectors.
An ecosystem skewed towards entrepreneurship rather than innovation – characterised by entrepreneurial manufacturing companies.	Survey Interviews	Interface campuses – with brokering support for E-cap sectors. Innovation Academy. New Maker Spaces – de-risking TRL 7-9 innovations/ideas.
Universities widely respected in supporting start-ups and in specialised beacon areas but with limited connections with mature manufacturing sectors.	Survey Interviews Flokk	Interface campuses – with brokering support for E-cap sectors.
Gaps in the ecosystem for cross-fertilisation of ideas across sectors, leading to niche innovation.	Survey Interviews Flokk	New spaces for knowledge exchange – to act as innovation arenas to tackle the Grand Challenges, and to encourage cross-fertilisation of skills from high to low R&D areas. Encourage growth of new complementary clusters that sit between and laterally to existing beacons.
Finance gaps to support growth and innovation.	Finance survey	Accelerators to provide corporate-led investment as stimulus for innovation. Capital support for E-Cap sectors to spur product and process innovation, and exporting potential.
Low awareness and absorptive capacity for innovation in some sectors.	Interviews	Accelerators to create industry-led (mode 2) innovations and knowledge diffusions. Retraining Programme to enhance manufacturing capabilities.

Fig 16 – Beacon Enablers in Leicestershire



We recognise that economic growth is as dependent on the continued growth and excellence of our Beacons as Bootstraps. The Leicestershire ecosystem has distinctive, world-leading USPs in space, sports, health, AI and cybersecurity that could create game-changing commercial innovation and inward investment opportunities. Beacon support might therefore include:

8. *A Business Development Campaign* – Building on the existing business support infrastructure to develop specialist support targeted at HPO areas to drive wider engagement and growth, through improved capture of internal and external markets, ancillary sectors, and through improved market intelligence and competitor analysis.

9. *Advanced Maker Services* – Development of advanced 'maker' services to address gaps in the ecosystem, aimed at TRL 7-9 and acting as a bridge between industry and R&D. providing dedicated space and a long-term funding programme, the advanced maker space and services would channel cross-sector skills and innovation, de-risk commercialisation of ideas to add value to existing HPO areas and fields of excellence. We envisage support for advanced prototyping, customer onboarding, equipment lending and material libraries, as well as facilitating accelerators, mapping TRL competences, and horizon scanning for emergent industrial scale services.

10. *An Innovation Academy* – A development linking HEIs to senior leadership in industry, and instils a culture of innovation in traditional sectors, enabling best practice transfer from beacons to other areas of the economy, and creating innovation readiness through high-level innovation skill development and mentoring.

11. *AI-led Innovation*– Drawing on cross capabilities in AI, to develop future specialisation linked to HPOs, with notable support for digital security, emerging technologies and services, robotics, and new industries such as digital health, holography, and mobility.

12. *Net Zero Innovation* – Drawing on cross capabilities in sustainable technology to pivot our unique and distinct beacon capabilities towards environmental grand challenges, with lateral developments in agri-food, health, smart mobility, sensors, and robotics. We see new potential emerging from the creation of innovation arenas – targeted and diverse spaces that connect existing clusters and interactions, informal spaces, and networks for cross-fertilisation of ideas tackling grand challenges.

Table 7 – Identified Issues and Action for I-Cap Capability

Issues for I-Cap Sectors ➔	Evidence	➔ Proposed Action
Latent Potential	Survey	Develop Beacons to full potential with enhanced exporting potential through a business development campaign to lever additional investment, and that refocuses E-cap sectors towards I-cap growth.
Critical Mass	Survey Flokk Interviews	Advanced maker services to encourage more E-Cap into I-Cap beacon areas.
New Innovations	Survey Interviews Flokk	Targeted support to encourage innovations in AI and Green economy as growth areas that complement beacon excellence , and as conduit for innovation upscale.
Knowledge Exchange	Survey Interviews Flokk	Innovation Academy to encourage best practice towards innovation and develop a culture of innovation in senior leadership of E-Cap sectors.

Delivering Beacons and Bootstraps

We have conducted a rapid review of Leicestershire's ecosystem drawing on the MIT REAP framework, and through a range of statistical, empirical, survey, and interview methods. We are confident that this multi-method approach has illuminated the position on the ground by taking account of different perspectives.

In Tables 6 and 7, and also at Appendix 2 and 3, we have detailed the way in which different issues raised through the MIT REAP programme will be addressed through our proposed framework. Our framework for action emerged through several iterations of design thinking by all members of the MIT REAP Leicestershire Team (defining the problems, ideation, and refining proposed activities with our stakeholders). The proposed actions form a central pillar for the IDEAS Group of the Economic Recovery Cell in Leicestershire, to which several members of the MIT REAP Leicestershire Team are represented. The proposed (draft) Economic Recovery Plan for Leicestershire demonstrates the commitment of the Team and wider ecosystem in implementing these proposed activities.

In coming weeks and months, the MIT REAP Leicestershire Team have committed to developing the framework in two ways:

1. To formalise the activities through stakeholder support – including formal consideration of the Framework by the LLEP Board (October, 2020), university approval through executive boards, and wider stakeholder buy-in through consultation activities. Our case study films will serve as an important tool for continuing our discussions, and we have detailed at Appendix 4 and 5, the action needed to take forward our proposals.
2. To expand the MIT REAP Leicestershire Team – Through the MIT REAP programme we have expanded our core team and connections through the survey, interview, and case study activities. We are aware that further consideration needs to be given to expanding these stakeholders through the LLEP IDEAS pillar group/Innovation Board and Economic Recovery Cell.

Bootstraps Pilot Programme (Must Win Battle)

Starting during February the MIT REAP Leicestershire team will be undertaking a proof of concept piece of work around changing cultures relating to risk and innovation within established SMEs. This will use the current COVID situation to look for businesses and organisations that can demonstrate key cultural and leadership skills that have allowed the organisation to innovate and react to the COVID restrictions and problems that it has generated. The pilot will look at those behaviours and leadership qualities that have resulted in a change of direction resulting in the business maintaining it financial stability and profitability or in some cases has been able to leverage new markets or working practices to increase turnover and profitability. The objective of the pilot would look to identify key areas of best practice and culture of success and use these to develop a programme of support that enable less successful business to learn these skill and behaviours and develop ways of deploying them in the business. The Pilot will:-

- Identify and consult with businesses that have a record of success over the last 12 months
- Identify key cultures and characteristics of successful business in difficult time (COVID).
- Identify key leadership skills and qualities that have enabled quick and effective response to changing. economic and societal changes
- Establish a programme of Best Practice.
- Review the finding against current support offers.
- Develop new support programmes to accommodate any shortfall.
- Engage businesses in the new programme to establish growth.

The outcome from the pilot will be used to develop a comprehensive proposal to be submitted for future activity to achieve the key goals of the MIT REAP Leicestershire team