Innovation Caucus

RETHINKING THE ROLE OF FURTHER EDUCATION COLLEGES IN INNOVATION ECOSYSTEMS

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About the Innovation Caucus

The Innovation Caucus supports sustainable innovation-led growth by promoting engagement between the social sciences and the innovation ecosystem. Our members are leading academics from across the social science community, who are engaged in different aspects of innovation research. We connect the social sciences, Innovate UK and the Economic and Social Research Council (ESRC), by providing research insights to inform policy and practice. Professor Tim Vorley is the Academic Lead. The initiative is funded and co-developed by the ESRC and Innovate UK, part of UK Research and Innovation (UKRI). The support of the funders is acknowledged. The views expressed in this piece are those of the author and do not necessarily represent those of the funders.

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> **To understand these roles, we explore the relevance of innovation to economic growth agendas and how the innovation ecosystem concept has emerged as a tool to understand the factors that influence business development and growth**

EXECUTIVE SUMMARY

The starting point for the study was to review the role of Further Education Colleges (FECs) and their potential contribution as part of the innovation landscape. Building on previous work, this project unpacks the current and prospective role of FECs in developing the innovation capabilities of businesses. Given the funding available to FECs through the Local Skills Improvement Plan and Strategic Development Fund pilots, there is an opportunity to support FECs in how they can develop their offering to support businesses to innovate. It is important to recognise that FEC are varied in their offerings, and the LSIP/SDF seeks to further ensure FECs are meeting the needs of businesses. To this end, the aim of the study was to explore and better understand the role and potential of FECs in the innovation ecosystem, and more specifically:

- Assess business needs to achieve their innovation outcomes;
- Identify the current and potential remit of FECs to support business innovation outcomes [beyond skills];
- Understand how FECs can support the innovation outcomes of businesses.

To understand these roles, we explore the relevance of innovation to economic growth agendas and how the innovation ecosystem concept has emerged as a tool to understand the factors that influence business development and growth. We identify the role and contribution of FECs as actors within their respective ecosystems, distinguishing between what we term ‘framing factors’ that shape the ecosystems, and ‘focal factors’ that FECs can deliver to augment and support businesses to innovate.

We offer several reflections on the role of FECs in their respective innovation ecosystem, which merit further consideration if the potential contributions of FECs are to be realised. They are:

1. The capacity of FECs is a key factor that determines the extent to which they can meaningfully support business innovation - currently FECs are neither designed nor resourced to deliver.
2. There is a need for FECs to better understand the innovation needs of local and regional businesses if they are to establish an appropriate and effective offer to support businesses in developing the capabilities to innovate and realise innovation-led growth.
3. As well as understanding business needs, there is a need to ensure that any offer by FECs complement and contribute to the existing provision within the ecosystem, which is already a cluttered landscape
4. The focus of FECs needs to be on supporting existing and established businesses in developing the capabilities to innovate, as opposed to supporting the creation of new innovative start-ups.

Situating FECs to play a more prominent role in innovation ecosystems requires interdepartmental and interorganisational coordination. In delivering on this agenda there is a need to recognise and articulate how the opportunity can be delivered through the collective commitment of the Department for Business, Energy & Industrial Strategy (BEIS), Innovate UK, the Department for Education (DfE) and the Gatsby Foundation. To support FECs in fulfilling a wider role there are opportunities for departments to work together to leverage different strengths and generate benefits. It is proposed that for:

- BEIS, the central government department owning the Innovation Strategy, FECs have the potential to contribute across the four pillars. In supporting the creation of College Business Centres, BEIS aims to build connections between FECs and local businesses in priority sectors. These present an opportunity to stimulate innovation by gathering intelligence on skills gaps, helping employers invest in skills, identifying and socialising new technologies and innovative practices, and nurturing entrepreneurship.
- Innovate UK, the role of FECs in the innovation ecosystem has the potential to increase the regional impact and the emphasis on the diffusion and adoption of innovation. This represents a major shift and extension in the remit of Innovate UK, and if empowered to do so, FECs have a potentially transformative role in promoting diffusion and adoption of business innovation through the innovation ecosystem.
- DfE, as the central government department leading on the skills agenda, there is an opportunity to see FECs contributing beyond skills provision to the innovation agenda. The role of FECs continues to evolve, and this represents a new direction that extends the role of FECs as a skills provider to include more applied outcomes in building the innovation capacity of businesses.
- the Gatsby Foundation, to realise its commitment in the Innovation Strategy to supporting FECs to identify and address the emerging skills needs of industry partners, there is a need to influence the increase in the provision of innovation-related skills that are outside of the prevailing skills and training system.

1. INTRODUCTION

Despite the demise of the Industrial Strategy, the UK Government continues to be committed to innovation-led growth as part of the UK's economic recovery in a post-Covid world. The pandemic has had an impact on the capacity of firms to innovate, as priorities have been reviewed and finances have been reprofiled. Ongoing research examining the impact of the pandemic on Innovate UK grant holders has found innovation projects to have been delayed in many instances. For less innovative firms, many of which comprise the longtail of unproductive firms, the focus has been on their survival and the innovation agenda has fallen further down the priority list.

Following the publication of HM Treasury's 'Build Back Better: our plan for growth' in March 2021, the Department for Business, Energy & Industrial Strategy's (BEIS) Innovation Strategy establishes the road map for innovation-led growth with the aim of becoming a global hub for innovation by 2035 and placing innovation at the heart of everything the nation does. Unleashing business investment in innovation is central to the Innovation Strategy. The roadmap outlines the approach to delivering on the plan for growth and creating high-quality jobs across the UK. Business-led growth is central to the strategy as although it is well-known that businesses that consistently dedicate resources to R&D are more productive and exhibit higher growth than their less innovative counterparts[1], the UK continues to lag behind international peers on core measures of R&D investment. As such, boosting firm investment in innovation, and their access to all of the types of support that facilitate the experimentation, risk taking, and adoption of technologies and practices that drive innovation is a core pillar of the strategy.

While the focus of the Innovation Strategy is rightly on firms, the context in which these firms operate is equally important. The concept of ecosystems has been adopted in policy and practice as a powerful heuristic to understand the system in which innovation occurs. In this report we draw on an ecosystems framework to examine the landscape in which these businesses operate. If businesses are to be effective in pursuing innovation, the ecosystem needs to incentivise, enable and support it. Recently, there has been a stronger focus on funding and finance for innovators via Innovate UK, as well as non-financial support via Innovate UK EDGE and the KTN. However, regionally, innovation support is uneven.

Despite the demise of the Industrial Strategy, the UK Government continues to be committed to innovation -led growth as part of the UK's economic recovery in a post-Covid world.

1 ERC (2020) State of Small Business (see https://www.enterpriseresearch.ac.uk/publications/state-of-small -business-britain-2020/); Kitson, M., et al. (2009). The Connected University: Driving Recovery and Growth in the UK, NESTA.

In addition to businesses, there are other key actors in innovation systems such as universities and Catapult centres, which have the capacity to collaborate in realising innovation outcomes. There are also other intermediaries such as the LEP Growth Hubs, charitable institutes, incubators and accelerators which also contribute to the curation and culture of the ecosystem. This constellation of actors collectively underpins localised ecosystems and are important sources of business support. There is considerable interest in finding ways to better leverage these assets to drive the innovation agenda and stimulate private investment. The substantive focus of this report is the potential role of further education colleges (FECs) as part of the innovation ecosystem, beyond their well-rehearsed role as a skills provider. The notion of FECs supporting business innovation is not new, and some colleges are already engaged in such activities, although this has never formally been required of FECs. But businesses and FECs can both benefit from enhancing synergies.

The 'Skills for jobs: lifelong learning for opportunity and growth' White Paper published by the Department for Education (DFE) in January 2021 emphasised the Government's commitment to ensure that businesses will be given a 'central role' in designing nearly all technical courses by 2030. In January 2021 it was announced that funding would be made available as a pilot through the Local Skills Improvement Plan (LSIP) Trailblazers and the Strategic Development Fund (SDF) to accelerate engagement with businesses. The funding available will enable participating FECs to create College Business Centres (CBCs) to facilitate collaboration and better meet the needs of businesses. To achieve this the CBCs will focus on the practical benefits to business, and stimulate demand to engage in a wider range of activities to support business innovation.

The starting point for the study was to review the role of FECs and their potential contribution as part of the innovation landscape. Building on previous work by the Gatsby Foundation[2] and the Association of Colleges[3], this project unpacks the current and prospective role of FEC in developing the innovation capabilities of businesses. Given the funding available to FECs through the LSIP and SDF pilots, there is an opportunity to support FEC in how they can develop their offering to support businesses to innovate. It is important to recognise that FEC are varied in their offerings, and the LSIP/SDF seeks to further ensure FECs are meeting the needs of businesses. To this end, the aim of the study was to explore and better understand the role and potential of FECs in the innovation ecosystem, and more specifically:

- **Assess business needs to achieve their innovation outcomes;**
- **Identify the current and potential remit of FECs to support business innovation outcomes [beyond skills];**
- **Understand how FECs can support the innovation outcomes of businesses.**

The project consisted of a number of stages that are summarised in the following sections of this report. Sections 2 sets out the context by summarising the evolving remit of FECs, before introducing literature on innovation and the ecosystems framework to frame the report. Section 3 presents the research findings, structured according to what we describe as framing and focal factors to differentiate between the potential role of FECs in the wider innovation ecosystem and the interventions through which they can support business innovation. Section 4 advances a logic model to conceptualise the new role of FECs in the innovation ecosystem in supporting the capacity and capability of businesses to innovate. Section 5 reflects on the key insights from the research and outlines next steps.

2 Baxter, E. (2019). Further Education Colleges and Innovation, The Gatsby Charitable Foundation

3 Association of Colleges (2020). Innovation in Further Education Colleges.

2. LITERATURE & CONTEXT

2.1 FEC Context

Post-secondary education institutions enhance the innovation and productivity potential of economies. While policy attention tends to focus on universities, which tends to be more research-intensive, and their direct role in knowledge generation, the further education (FE) sector's contribution to innovation processes tends to be poorly defined. Even so, public policy has repeatedly sought to use these institutions as levers for economic development. While FECs have focused primarily on skills provision, their ambit has evolved over time to give them an increasing role in innovation ecosystems.

The emergence of the formal FE sector in the UK was a response to perceived skills deficits identified in the UK economy and the belief that FECs would be instrumental in redressing those gaps. Previous policies had placed the onus for skills development and training on employers and so this shift in approach concentrated unprecedented levels of policy interest on establishing governance, regulation, benchmarks and control in this sector.[4] The 1988 and 1992 Education Acts formalised this relationship, granting institutions autonomy, and responsibility, to deliver "academic services" as efficiently as possible. The creation of a two-sector tertiary system differentiated FECs as institutions offering instruction at levels below higher education. However, the 1997 Dearing Report recommended that FECs take a more active role in expanding undergraduate education and they emerged to collaborate and compete with universities.

Throughout this period, higher and further education were increasingly seen as solutions to policy problems and keys to unlocking national (and more localised) competitiveness. They were ranked among the economic engines that could drive productivity and growth.[5] In particular, the vocational focus and their "closeness to the world of work"[6] has meant that FECs were seen as a tool to improve the skills base of the current and future workforce, especially at the higher levels. As skills became more important to policy agendas, FECs also offered a cost-effective way of expanding access to higher education and widening participation, with programmes that could be delivered more flexibly and rapidly in response to demand. In this context, there has been pressure to expand offerings, provide accredited qualifications, and structure courses and modules to offer a more "HE-like" experience and culture.[7] Along with this have come expectations about the broader contribution FE can make to innovation ecosystems that are often more in line with more research-intensive institutions.

4 Sharp, P. (2002). "Surviving, Not Thriving: LEAs since the Education Reform Act of 1988." Oxford Review of Education 28(2/3): 197-215.

5 This trend is not exclusive to the UK. See Belanger, C. H., et al. (2005). "National Innovation and the Role of the College Sector." Canadian Journal of Higher Education 35(2): 27-48.

6 Department for Business Innovation & Skills (2012). Understanding Higher Education in Further Education Colleges.

7 Lea, J. and J. Simmons (2012). "Higher education in further education: capturing and promoting HEness." Research in Post-Compulsory Education 17(2): 179-193.

Recent research highlights the many ways that FECs can play a direct role in supporting businesses and strengthening the innovation economy. A 2016 Skills Commission report highlighted FE's potential to deliver different and creative approaches to solving problems and pushing boundaries to serve communities and businesses.[8] On skills, engaging with business has been central to programme development especially in vocational education, traineeships, apprenticeships, and N/SVQs highlighting existing expertise in meeting business needs. The Association of Colleges (AOC) noted the capacity of FECs to support the development of businesses by providing advice and guidance, including adoption of new technologies.[9] Work by the Gatsby Foundation echoes this position, outlining examples of how FECs are active across six sets of innovation themes or offerings such as hosting business-focused programmes, brokering access to equipment, facilitating further skills development and exchange, knowledge diffusion, consulting, and networking.[10] The New Engineering Foundation (NEF) has emphasised the contribution of FECs in supporting knowledge transfer, and advocated for a national framework to support these activities.[11]

In practice, while FECs have a clear skill mandate, the underlying focus of Further Education policy has evolved over the past two decades to promote and strengthen relationships between FECs and business. This can be seen through the Centres of Vocational Excellence (2001), National Skills Academies (2004), Employer Ownership of Skills (2012), National Retraining Scheme (2017) all of which required integrating employers as a condition of funding and have stimulated ongoing interaction between firms and FECs. The trajectory of FECs has become more engaged with and closer to businesses, while still being skills-led. Crucially, this has culminated in greater recognition that FECs not only can but should assume a role beyond that of an education provider in supporting business growth. This report builds on previous research to explore in more depth how FECs can contribute to innovation and ecosystem development, how some are already innovating and acting in these areas, and to consider what is needed to better understand the opportunities and challenges associated with these roles.

> **Over the past two decades to Further Education policy has sought to promote and strengthen relationships between FECs with business.**

8 Skills Commission (2016). Going Places: Innovations in Further Education and Skills.
9 Association of Colleges (2020).
10 Baxter (2019).
11 The New Engineering Foundation (2008). Knowledge and Technology Transfer in Further Education.

2.2 Innovation and ecosystems

Despite the mission creep in the role and remit of FECs, their potential and actual role as catalysts to innovation has been comparatively limited. This section introduces the concept of innovation, defined as the generation of new practical knowledge,[12] from which value can be created and captured (see Box 1). It is important to understand the nature of innovation, its adoption, and the ecosystem in which it occurs in order to identify opportunities for FECs to support businesses to innovate.

Innovation is the lifeblood of business. It is key to the evolving Industrial Strategy and the related goals of national growth and levelling up regional economies, which rely on stimulating firm growth and scale ups. Innovation also has important societal impacts and is at the heart of promoting wellbeing, enhancing quality of life, increasing security and resilience, and in building the UK's reputation and influence.

The benefits of innovation and business success are undeniable with some figures estimating that firms that prioritise investment in R&D are 13% more productive than firms that do not.[14] The UK is among the most innovative countries in the world.[15] Ranking within the top 10 for knowledge impact, it is a world leader in producing ideas and technologies. Creating knowledge, however, is only part of the equation. Absorptive capacity is a concept coined to capture the ability to assimilate and manage knowledge in order to improve innovation performance and competitive advantage.[16] Currently, the UK struggles to adopt and adapt innovations and in translating these into new products and services, ranking only 11th in the world in terms of knowledge diffusion and 27th for absorption.[17] As a result, the challenge for innovation-led growth agendas is both how to increase the amount of innovation being produced but also its circulation, diffusion, and absorption. There is also a need to understand and address regional variations that are impacting the levels of innovative activity among businesses.

Box 1: Defining Innovation Activities

The UK Innovation Survey lists all the following as instances of innovation:

- The introduction of a new or significantly improved product (good or service) or process.
- Engagement in innovation projects not yet complete, scaled back, or abandoned.
- New and significantly improved forms of organisation, business structures or practices, and marketing concepts or strategies.
- Investment activities in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities. [13]

12 de la Mothe, J., & Paquet, G. (2012). Local and Regional Systems of Innovation. New York: Springer.

13 BEIS (2020). UK Innovation Survey 2019: Headline Findings Covering the Survey Period 2016-2018. Released 26 March, 2020.

14 BIS (2014) Innovation report 2014: innovation, research and growth, HMSO, London

15 WIPO (2020). Global Innovation Index.

16 Abreu, M., et al. (2008). "Absorptive capacity and regional patterns of innovation."

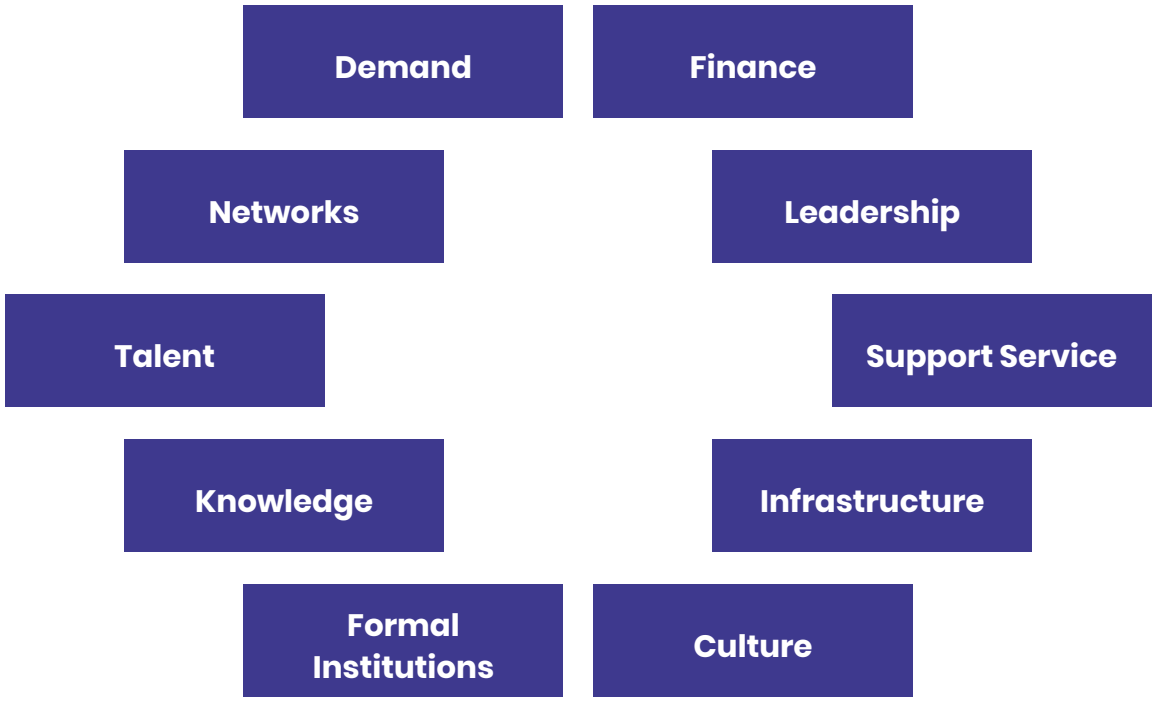
17 Ibid.

As we will see in our analysis, FECs have the potential to contribute to all types of innovation (e.g. product, process, service), but because they are typically less research intensive, knowledge transfer may be best suited to solutions-based and applied interventions. In particular, FECs may improve knowledge diffusion and adoption through not only typical knowledge and technology transfer processes, but as sources of information about emerging technologies and by developing the tacit knowledge about how to function with these innovations through firm partnerships and course developments (among other things). Again, due to FEC's generally more technical mission they are often well-placed to learn about new technological developments, experiment with instruction in these areas, and communicate this applied knowledge to their students and business partners.

In this respect, FECs contribute both to individual businesses through direct partnerships as well as functioning as assets for the broader innovation ecosystem. An innovation ecosystem is the environment of legal and regulatory frameworks, physical and digital infrastructure and institutional landscape (among other conditions) in which businesses, organisations and academics operate when undertaking innovative activities. These establish the contexts, the framework conditions, in which innovators operate, and as such changes to these contexts can influence innovation outcomes. A well-functioning ecosystem supports innovation from idea through to commercialisation, adoption, and diffusion.

Figure 1: Element of Ecosystems

Adapted from Stam and Spigel (2016)



The literature on ecosystems is growing quickly and has spawned several different models of what factors are most important.[18] Most of these consist of lists of elements and descriptions of how they support entrepreneurs and firms. Figure 1 depicts the elements of Stam and Spigel's[19] interpretation, which is one of the most comprehensive. This framework can serve as a useful frame of reference to understand the factors that impact innovation outcomes and situate the role of various actors - including FECs - in fostering conditions to sustain prosperity. This approach builds on various traditions, including clusters, innovation systems, and urban economies and focuses on the localised conditions for innovation, entrepreneurship, and growth.[20]

We adapt the ecosystems framework in two ways in this project. First, we employ it to both hypothesise and test areas where FECs might play a role in enhancing innovation-led growth. While FECs make a clear and obvious contribution to talent and human capital provision, they can also impact innovation ecosystems through many other vectors. Section 3 is structured around seven of the areas from this model and uses these to review the literature on impacts and to explore examples compiled from our interviews with FECs. Secondly, this framework enables us to envision and develop a logic model. This is informed by a theory of change, which describes and explains the potential role and impact of FECs as catalysts for innovation. The following section elaborates our core findings before discussing how these informed the development of a logic model.

> **"FECs have the potential to support firms in pursuing a range of innovation projects"**

18 See most notably, Stam, F. and B. Spigel (2016). "Entrepreneurial ecosystems." USE Discussion paper series 16(13); Brown, R. and S. Mawson (2019). "Entrepreneurial ecosystems and public policy in action: a critique of the latest industrial policy blockbuster." Cambridge Journal of Regions, Economy and Society 12(3): 347-368; Malecki, E. J. (2018). "Entrepreneurship and entrepreneurial ecosystems." Geography Compass 12(3): 23-59; Isenberg, D. (2011). "The entrepreneurship ecosystem strategy as a new paradigm for economic policy: Principles for cultivating entrepreneurship." Presentation at the Institute of International and European Affairs 1(781): 1-13.

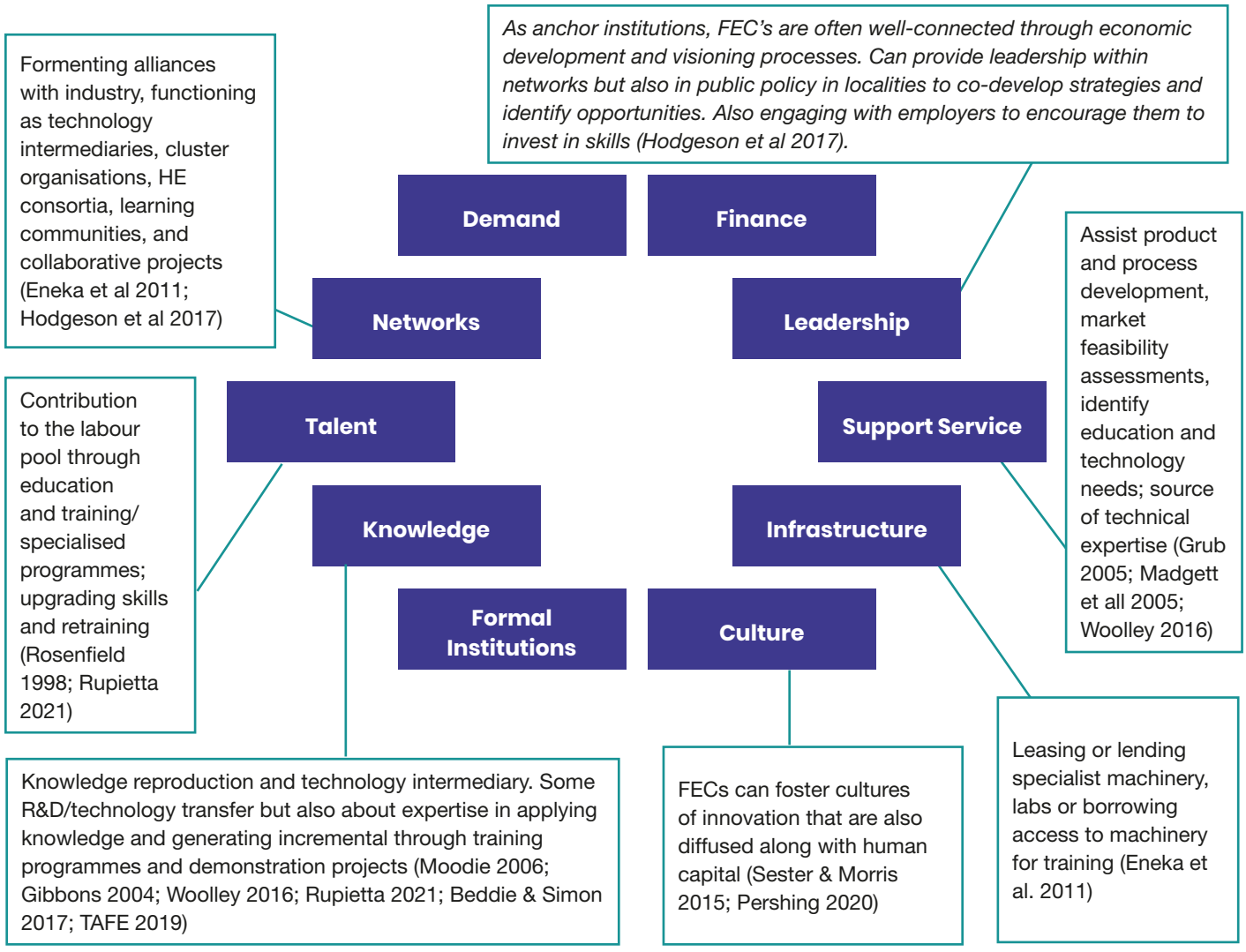
19 Stam and Spigel (2016).

20 Suominen, A., Seppänen, M., & Dedehayir, O. (2019). A bibliometric review on innovation systems and ecosystems: a research agenda. European Journal of Innovation Management, 22(2), 335-360.; Oh, D.-S., Phillips, F., Park, S., & Lee, E. (2016). Innovation ecosystems: A critical examination. Technovation, 54, 1-6.

3. RESEARCH METHODOLOGY & FINDINGS

Further to the literature review that frames this report, a series of primary interviews were conducted with FEC leaders and businesses to understand the opportunity to support business innovation. Building on the work of the Gatsby Foundation and the Association of Colleges, the FECs and businesses were selected from a purposive sample of colleges known to be engaged with activities to support businesses to develop greater innovation capabilities and achieve innovation outcomes. Between March 2021 and May 2021, a series of 34 interviews were conducted, of which 13 were from FECs and 21 from businesses. Semi-structured interviews were conducted using a topic guide that was divided into three parts: i) Experience and understanding of FEC support for business innovation; ii) Current provision/engagement with business innovation support activities; and iii) future provision/engagement with business innovation support activities. The interviews were reviewed and coded by theme. The remainder of this section discusses the findings and analysis of the key themes, structured according to what we describe as framing and focal factors that support the capacity and capability of businesses to innovate.

Figure 2: Elements of Ecosystems Most Relevant to FECs



Of the FECs and businesses consulted, the FEC were found to play a variety of roles in innovation ecosystems, and in supporting business innovation. This section focuses predominantly on the elements of the ecosystem framework presented in section 2, with further annotation provided in Figure 2. Of the ten elements introduced above, there are three that we are not focusing on here, they are i) Finance; ii) Formal institutions; and iii) Demand. Of these, i) and ii) are outside of their remit of FECs - they do not provide finance to businesses and they are not a formal institution in terms of shaping government or governance of the ecosystem. Here the demand element refers to ensuring that there is demand for new goods and services, which in this context is receptiveness to firms to engage with the FECs to develop their capabilities to innovate. This is by its nature latent, if not absent, and it is the purpose of the CBCs to stimulate demand to engage with the FECs. However rather than looking at the demand element as separate, developing demand is explored through the elements of the ecosystem collectively termed 'focal factors'. The aim of the CBC pilot is to develop a value proposition that compliments and contributes to the wider activities of the innovation ecosystem.

The remainder of this section is structured in three parts. First, we identify the role and contribution of FECs as actors within their respective ecosystems, what we term 'framing factors'. Focusing specifically on the elements of 'Leadership' and 'Culture', the discussion identifies how FECs can actively shape the ecosystems of which they are a part. Second, the discussion considers what we term 'focal factors', which are associated with the activities that FECs can deliver to augment and support businesses to innovate. Third, in closing the section we highlight the focal factors as the focus for FECs in developing CBCs, and propose a simplification by collapsing the elements from five to four given their relatedness when viewed as support provided by FECs.

> **"The CBC pilot extends the role of FECs as part of the innovation ecosystem."**

3.1 Framing Factors

The framing factors are used to describe the role of FECs in shaping the wider innovation ecosystem, as opposed to the direct interventions to support business innovation. If through their engagement FECs are to become an active part of the innovation ecosystem, they by definition contribute to shaping it. Building on previous academic research, the interviews highlighted the current and prospective role of FECs in the leadership of innovation ecosystems and as a catalyst to fostering a more innovative and entrepreneurial culture. For both of these factors, FECs can develop internal capacities that have external benefits as well as engage proactively to enhance other elements of the ecosystem.

3.1.1 Leadership

As anchor actors in regional ecosystems, FECs are well-positioned to play a leadership role. As owners of real estate and (sometimes) land and (usually) large employers, they have a strong interest in local economic policy and development strategies and can both identify and contribute to development opportunities.[21] Others note that colleges can take a broader view and work with localities to understand labour pool and industrial projections and skill demand trends (as these are both central to their business model and relevant to regional development trajectories). The UCL Institute of Education report also notes that they can proactively engage with business to learn about needs and gaps as well as encourage them to invest in the skills of their workforce.[22]

Box 2: Contributing to regional leadership

Across England there are a number of examples of FEC being engaged with their Local Enterprise Partnerships and or Combined Authorities. Several FECs have a representative on their Board of their local LEP, although there is more likely to be an FEC representative on sub-groups of the LEP – most commonly the Skills Boards. The underrepresentation of FECs on LEPs, especially beyond the skills agenda, represents both a challenge and opportunity.

If FECs are to become an established part of the innovation ecosystem, then they also need to represent the interests of FECs through regional governance structures. While the LSIP/ SDF funding is intended to transform the responsiveness of local skills systems in meeting the changing skills needs of employers, it is paramount that the voice of FEC clearly articulates the offer of colleges and how it will support business innovation and growth.

In this description, leadership is conceptualised along two axes. First, leadership in identifying and developing businesses can be a proactive mission. In this instance, the FEC has a vision of the innovation ecosystem and its potential and uses its resources to engage with and educate firms about how its offerings can be transformative to mutual benefit. In a second instance, the FEC may be less targeted. Instead, this involves thinking about how the ecosystem as a whole might grow and either assembling or joining coalitions that are involved in that collective visioning process. As highlighted elsewhere, FECs exhibit very different levels of maturity in business development units and their capacities, their engagement with and interpretation of market intelligence, and in professional cultures within relevant offices that align with and understand business constraints and needs.

21 UCL Institute of Education (2017). Education, skills and employment in East London: an ecosystem analysis; see also Porter, M. (2007). "Colleges and Universities and Regional Economic Development: A Strategic Perspective." Forum for the Future of Higher Education; Kitson, M. et al (2009). University-Industry Knowledge Exchange: Demand Pull, Supply Push and the Public Space Role of Higher Education Institution; Kitson, M., et al. (2009). The Connected University: Driving Recovery and Growth in the UK, NESTA.

22 UCL Institute of Education (2017).

There are a number of FECs that are engaged with the LEPs to identify needs in the areas of skills and business development, which feed into LEP strategies. This has been particularly effective where FECs are able to use these insights to develop courses and shape curriculum as part of a collective vision. This demonstrates how FECs both have and can contribute to supporting businesses more directly, and benefit from co-creating an offer that aligns with the priorities of the broader ecosystem. The example in Box 3 is another way that FECs can demonstrate leadership that supports both the ecosystem and internal agendas. By convening business in an area experiencing skills shortages within the centre, Fareham College helped to solve a pressing problem affecting the ecosystem and created the conditions for deeper knowledge exchange and networking in a competitive industry. Where effective, this convening role can support in the diffusion and adoption of innovation to firms, as well as developing the absorptive capacity to innovate.

Box 3: Leading by convening businesses around emerging needs

The Centre of Excellence in Manufacturing and Advanced Skills Training (CEMAST) at Fareham College, is a state-of-the-art training facility for a range of engineering disciplines. The centre is located on the Solent Enterprise Zone and works with a wide range of employers located in the two rapidly expanding business parks operating there. It was funded in collaboration with the Solent LEP and has since attracted funding from the Solent Growing Places Fund, Regional Growth Fund, Hampshire County Council and Skills Funding Agency. The convening power of the College brings partners together as demonstrated by the evolution of the Civil Engineering Training Centre (CETC) campus.

The CETC facility, co-located with CEMAST is a collaboration of 16 employers who partner with the college in the area of civil engineering. Despite the competitive nature of their businesses, an acute shortage of labour and semi-skilled ground workers catalysed the group to come together in 2017 to share their experiences in the Solent Civil Engineering Employer Group (SCEEG). This forum and the ensuing skills programme allowed Fareham College to provide a completely different training delivery model for these businesses. The facility was designed to provide a fully operational, realistic groundworks and civil engineering training environment that provides students and employers access to machinery, tools, materials and resources needed to ensure that learners develop work-ready skills and credentials.

3.1.2 Culture

A localized culture that is supportive of entrepreneurship, risk taking, innovation can be an important foundation for economic development and growth. In many respects the regional culture represents the glue that links the elements of the ecosystem. As such, and as with leadership, here FECs can be thought of as contributors to the culture as well as being a part of it. If FECs are to shape the entrepreneurial culture of their ecosystem, there is a need for them to develop a presence and reputation in supporting innovation and enterprise.

Box 4: Curating Innovation Cultures

In some FECs there is an internal culture of innovation and entrepreneurship, which is then apparent in the skills and attributes of learners that are employed in local and regional firms (see Box 4). This internal culture of innovation involves fostering an environment and set of practices that continually introduces new ideas or ways of thinking, then translates them into action to solve specific problems or seize new opportunities.[23] This is undoubtedly important, and is reflected in the prominence of the enterprise education agenda, which has raised the profile of providing learning opportunities to help students develop enterprising and entrepreneurial attitudes, knowledge and skills. This provides an important link between education and the world of work and business[24], however, there is a need to also promote innovation and enterprise within firms. To achieve this requires FECs to engage beyond the skills agenda.

FEC are more renowned for their cultures of learning than cultures of innovation. Where there have been examples of innovation in FECs, these have tended to be in terms of the curriculum and pedagogy. However, the focus on innovation is often explicit and part of FEC missions and strategic plans. Fareham College, for example, lists innovation in "design, development and delivery of our curriculum and services"[25] as one of its core objectives and aims to foster a culture of high expectations across students and faculty. Another example is Dudley College of Technology, which has an emphasis on a culture of pedagogical experimentation through communities of practice. It also supports a broader culture of innovation through encouraging cross-college collaboration and creativity with business, and recognising engagement through their digital barometer and digital innovation awards.

In contributing to an innovation culture, developing the role of FECs in a wider range of knowledge exchange and capacity building activities is crucial.[26] Innovative cultures do not just emerge, and there is a potential role for FECs in supporting businesses to develop the capabilities to innovate, engaging businesses to think about opportunities to innovate. Creating and sustaining a culture of innovation at the institutional scale can be challenging but has emerged as a priority for FECs worldwide seeking to promote additional dimensions of their offer.

"FECs have the opportunity to contribute to support business innovation by offering a wider range of knowledge exchange and capacity building activities."

23 Sester, B. and H. Morris (2015). Building a Culture of Innovation in Higher Education: Design & Practice for Leaders - Emerging Lessons and a New Tool.
24 Young, D. I. (2014). Enterprise for all: The relevance of enterprise in education, HMSO, London
25 Fareham College (2020). Self Assessment Annual Report 2019/20.
26 The New Engineering Foundation (2008).

3.2 Focal Factors

The reference to focal factors is used to describe the direct interventions of FECs to more directly support business innovation. Through the interviews the questions identified the current and prospective ways in which FECs served to support businesses in relation to a number of elements of the ecosystem identified as most relevant to FECs. The remainder of this section discusses five elements, namely: i) Talent (and skills); ii) Knowledge; iii) Infrastructure; iv) Networks; and, v) Support Services.

3.2.1 Talent (and skills)

One of the elements mentioned across all innovation ecosystems frameworks is skills (also referred to as a talent or human capital).[27] This is because knowledge is produced by people. Innovations spring from people. And new ways of doing things are adopted by people. The skills profiles, degrees of training and experience of the people in a place all inform how likely that place is to be innovative. Given this, there is a clear logic to FECs being positioned more centrally to support the innovation agenda.

Given that training is a core function for FECs, it is a logical place to start our tour of activities that promote business impacts. While policy tends to privilege the skills that emerge from research intensive HEIs in innovation processes it is important to recall that "technical workers with intermediate qualifications intervene in the design, functioning and maintenance of products and processes, and therefore contribute (or can contribute) to innovation in companies. Innovative companies need a skilled workforce involved in the continuous improvement of processes and products (incremental innovation, "learning by doing")", which FECs can provide. This is particularly relevant as skills shortages are often reported in the technical vocations.[28]

Note that FECs can be highly integrated into their ecosystems – and perhaps more so than HEIs – because they tend to extensively use firms in their regions for work placements and workplace training. Workplace training programmes therefore become connections through which FECs can detect companies' requirements and promote their training resources and technical services.[29] The often-close relationship between FECs and regional employers has evolved over a number of years, and the challenge of seeing FECs contributing to support business innovation more prominently is in changing the tone of these relationships.

27 See Stam and Spigel (2016); Isenberg et al. (2009); Malecki (2018).

28 See UCL Institute of Education (2017) for their assessment that in East London there is an overprovision of academic skills and not enough technical.

29 Rodríguez-Soler, J. and I. Brunet Icart (2018). "Between vocational education and training centres and companies: study of their relations under the regional innovation system approach." Studies in Continuing Education 40(1): 46-61. This is also one example of the highly interdependent nature of the elements of the ecosystem – this training relationship relies on and builds networks between the FEC and industry and between individual students and the industry. This reciprocal interaction can contribute to formalized and informal knowledge exchange.

Every college we engaged with in this study had a key focus on propagating the next generation of skilled workers for firms in the local economy. For some colleges this is simply provision from a menu of available courses that are delivered regularly as standard. However, several colleges involved in this study stood out for developing training specific to business needs. In such cases, there is often a significant iterative process of curriculum development, course content and materials as the colleges and businesses partner together to co-create an ideal solution.

The two examples in Box 5 show FECs engaged in knowledge creation and exchange that relate to core function as skills providers, but also contribute to the diffusion of innovation. In these cases, impacts derive not from educating students for the general workforce, but through a specific partnership with firms within the ecosystem that address a business need. As we will see, this process of partnership building can offer other opportunities for both FEC and firm development, and there is scope to extend this way of working with other forms. Building the capacity and capability of firms in this way is central to supporting firms to imagine more innovative activities.

Box 5: Training, Teaching, and Knowledge Exchange

Two notable examples of how FEC are working across silos to promote knowledge exchange that builds of current teaching and training provision, they include:

- The Chichester College Group where work placements are a key vector in supporting knowledge transfer. To this end, students have started to positively impact companies, including making recommendations for environmental improvement. Based on insights developed through their programmes of study, learners identified key areas for improvement e.g. the recycling process and the reduction of waste.
- The East Kent College Group has developed partnerships with a number of businesses, including a small engineering company specialising in packaging and labelling to offer training on cutting-edge printing equipment. As part of the training process, students from the college were invited to participate. This resulted in the co-design of an add-on using 3-D modelling techniques to improve the printing process, nearly doubling efficiency and a patent filing for the IP.

3.2.2 Knowledge

In the research and innovation landscape universities are privileged as centres of knowledge creation, overlooking the wider range of organisations engaged in research and knowledge creation including FECs. It has been argued that FECs should "eschew research" and focus on stimulating 'the timely take up, modification, and marketing of knowledge solutions that already exist but need to be adapted to local environments'.[30] While research is not a primary role of FECs, there are a number of FECs that are engaged in different types of applied research and experimental development (see Box 6). Indeed, FECs can be well suited to solving technical, process and social problems in a community or industry,[31] as well as adding value through their knowledge reproduction and diffusion roles.

Box 6: Supporting knowledge creation through research.

Bishop Burton College carries out extensive research with a specialist agronomy firm, at its farm in Yorkshire. Over the years, staff and students at Bishop Burton have engaged in a range of applied research projects facilitated by the unique capabilities that the college can provide. These include the availability of land for crop trials, the presence of livestock, a farm manager and sustainability manager to run trials, which are exemplified by the following two projects. In 2016 a first project saw the firm start to look at rye in pig feed diets in collaboration with the college. They successfully worked with the college staff, students and local breeders to test different diets with pigs. Farmers are now growing Rye for pig feed diets throughout the UK and this trend continues to build momentum. In a second project, Bishop Burton now operates a fully digital farm (with large plots monitored by satellite to recommend optimised crow growing parameter settings). The business partner will this year take their first opportunity to test crop variables on a fully digitized farm.

While FECs do generate and transfer knowledge through many of the same knowledge exchange mechanisms as HEI (see support services, below), the knowledge embodied in learners is also crucial to adoption and diffusion.[32] Toner and Woolley note that "the capacity of firms, government agencies and other organizations to absorb, adapt and use these innovations will always depend to some extent on the technical competences of the internal workforce"[33], which is partly dependent on the FEC sector. Some of the literature refers to technical workers as "change agents" in organizational innovation. Change agents are "key individuals who proactively create, experiment with, validate, and influence the development and implementation of new organizational practices, processes, and structures".[34] These agents combine external knowledge, acquired in FECs with tacit knowledge from job experience to drive innovation.

30 Belanger, C. H., et al. (2005); Gibbons, M. (2004) Globalisation, innovation and socially robust knowledge, in R. King (Ed.), The university in the global age. Houndsmills: Palgrave Macmillan.

31 Victorian TAFE Association (2019). Doing Applied Research in Victorian TAFE Institutes: An Introductory Guide; Moodie, Gavin (2006) Vocational education institutions' role in national innovation, Research in Post-compulsory Education, volume 11, number 2, pages 131–140.

32 Kitson et al (2009).

33 Toner, P. and R. Woolley (2016). "Perspectives and debates on Vocational Education and Training, skills and the prospects for innovation.";

34 Rupietta, C., Meuer, J., & Backes-Gellner, U. (2021). How do apprentices moderate the influence of organizational innovation on the technological innovation process? Empirical Research in Vocational Education and Training, 13(1), 1.

FECs are engaged in knowledge generation, formal exchange through partnerships, and established partnerships to different degrees. Similarly, this practice varies across departments. The NEF report observed that much of the knowledge and technology transfer that does occur is ad hoc and opportunistic.[35] Despite a concerted effort on behalf of some colleges to identify or attract potential partners and pinpoint and respond to their specific needs, this can be challenging, even for the most experienced of colleges. Box 7 highlights the breadth of issues that the college engages with and particularly highlights how it contributes to innovations in management, processes, business models, and practices. There are several ways in which colleges could address the challenges of engagement, including having a formal process in engaging partner businesses, having employer boards from which they receive regular, relevant information and feedback or running employer days where businesses are invited to contribute to discussions on what is relevant and important to them. Central to supporting businesses to develop their capabilities to innovate is understanding business challenges.

Box 7: Supporting non-technical innovation

The provision of many FECs is well placed to support 'technical' innovation (including adoption and diffusion of new to business innovation) given their sectoral focus, but also in supporting non-technical innovations related to business management and operations. A college based in the North West of England has developed an approach to working with businesses centred around defining and solving problems. The College has successfully delivered project outcomes based on the needs of businesses, with staff engaged in co-creation of programs to meet employers needs in terms of skills planning, networking and coaching. Recent examples include working with businesses to overcome supply chain challenges and supporting businesses with flexible working during the Covid pandemic. The need to enhance project management skills in the sector is an important prerequisite to realising wider innovation opportunities.

3.2.3 Infrastructure

In the literature, infrastructure refers primarily to physical infrastructure such as transportation and communications networks. However, in the context of ecosystems this can also refer to specialised equipment and facilities that enable innovation and development. This may be as simple as land or building space but can also extend to facilities like labs, production facilities, air gapped computing centres, servers, or specialised product testing facilities. FEC's with specialised programmes often require, and acquire, equipment or facilities to support instructional activities. When not in use, these assets can be leveraged to enhance the innovative capabilities of local firms

Interestingly, some sources have noted that the infrastructure sharing relationship can go both directions, with colleges borrowing access to machinery and equipment located in firms for training purposes have also been documented (see Box 8).[36] In this case, knowledge diffusion and process innovation may occur in parallel as FECs gain applied insights from interacting with the equipment and the principals in the firm charged with running and maintaining it and transmit those through course work and other partnerships.

35 The New Engineering Foundation (2008).
36 Eneka et al. 2011

Box 8: Sharing Infrastructure

The infrastructure of FECs has primarily been developed to support learning, however the assets have opportunities for wider application as illustrated in the following two examples:

- A strong example of infrastructure sharing from FECs driving benefits for all parties is the Dudley Advanced II Centre for Advanced Building Technologies at Dudley College. The facility provides a modern method of construction training. Over the past number of years, the college has been working with their partner, Totally Modular, who build offsite housing. As an area of critical interest, the company wanted to work on a flood defence system for a modular unit they were developing. 12 months ago, Dudley College provided Totally Modular space at their hangar at the Dudley Advanced II building which comprises 5 stories. This has enabled Totally Modular to carry out research into the development of an innovative flood defence system. Students at Dudley college have benefitted by seeing the collaboration come to life and by getting involved in some of the work. Whilst not a commercial relationship, the college and students benefit from being part of the research with the partner company.
- Developing a strong technology infrastructure for training and knowledge dissemination, as exemplified by the partnership between South Devon College and ABB which provides both parties with access to the latest automation and control technologies. This gives students hands-on experience of some of the latest automation and control technologies and an insight into how they are helping enterprises realise the power and efficiencies of today's digital transformation. This specialised equipment enables learners from industry who have access to that equipment go back into the workplace and are able to rapidly put it into practice. This results in mutually beneficial outcomes to the business and the college. The companies that learn the techniques are also exposed to new technologies, ways of working, and techniques which help them innovate. In this case, ABB provided specialised infrastructure to the FEC, which then used it to train students and learners from industry.

On balance the provision of and engagement with the infrastructure of FECs was not frequently referred to in the interviews or widely used as an anchor for knowledge exchange in their respective ecosystems of the FECs we investigated. Few FECs interviewed mentioned having specialised infrastructure that might be of interest to business partners. This may be because they did not have any or because they were not active in seeking opportunities to leverage these assets. Other colleges also managed to find partners to absorb underutilised capacity, but these were not relationships that were likely to contribute substantially to developing the ecosystem, however useful they were to the college's bottom line.

3.2.4 Networks

Social, civic, and business networks have a positive impact on innovative activity, and a rich literature explores the catalytic and transformative power of these invisible forces within ecosystems. The capacity for networking is seen as essential for tapping into the shared intelligence of both the individual firm organisation, as well as a collectivity of firms within a given geographic space and a key foundation for open innovation.

The interaction between diverse groups of actors participating in networks takes the form of sharing information, knowledge and perspectives, as well as coordinating their activities to achieve and implement more effective solutions to problems — particularly in situations where the solutions lie beyond the capacity of any one party to achieve. In addition to these critical coordinative functions, innovation and diffusion processes networks are important knowledge transmission functions and influence knowledge spillovers.[37] They also connect actors with the information, advice, and resources.[38] Networks that function at the regional scale act as bridges between regional resources (knowledge, labour, etc.) and regional innovation processes. Networks emerge and knowledge percolates through iterated interpersonal or business interaction in physical or virtual spaces (such as social networks or using digital communications).

The literature does suggest a potential role for FECs in collaborative research networks and innovation projects but does acknowledge that because their offerings are typically less research-intensive this practice is relatively rare.[39] Most significant network interaction noted in the literature focuses on the role of FECs as partners in cluster and economic development networks and coalitions. This includes functioning as technology intermediaries, participating in cluster organisations, higher education, and/or development consortia, and spearheading learning communities (see Box 9). Many FECs convene local and regional business and employer forums hosting business events and other similar networking opportunities and many leaders in FECs sit on local business groups, such as BID boards, Towns Deal Boards, LEPs, and other local development groups.[40] Also significant are network relationships with industry for work placements (as described in the knowledge and talent sections).[41] FECs also collaborate with one another, and with HEIs, to develop programmes and capacity that can improve the innovative potential of the ecosystem. For instance, FECs are involved in networks to support Institutes of Technology that also include universities and leading employers in the areas in which they are located.[42]

“Facilitating knowledge sharing through networks is a catalyst to the adoption and diffusion of innovation.”

37 Nelles, J. and D. A. Wolfe (Forthcoming). Urban Governance and Civic Capital: A Survey of an Evolving Concept. Munk Center for International Relations, University of Toronto, Innovation Policy Lab.

38 Christopherson, S., et al. (2008). “Innovation, networks and knowledge exchange.” Cambridge Journal of Regions, Economy and Society 1(2): 165-173.

39 See Rodríguez-Soler & Icart (2018)

40 Association of Colleges (2020)

41 Eneka et al 2011; UCL Institute of Education (2017)

42 Department for Education (2019). “The First Twelve Institutes of Technology Announced.” https://www.gov.uk/government/news/the-first-twelve-institutes-of-technology-announced

Box 9: Engaging with Networks for Ecosystem Development

Further to the examples and opportunities for FECs to become more engaged in the leadership and governance of the innovation ecosystems of which they are a part (see Box 1), a number of colleges were engaged in and supporting the impact of wider business networks.

- The Activate Learning Group has colleges located across Oxfordshire, Berkshire and Surrey offer a wide range of educational provision. However, the Group has been highly effective in building links with business networks. For example the presence of the leadership team of Activate Learning Group and constituent colleges on the Board of Oxfordshire Business First and the Thames Valley Forum. Engagement in these networks is critical for building more collaborative and cooperative relationships, which are critical to driving cultural change and new ways of doing business.
- South Devon College is a member of SMART Skills Devon, a partnership between FEC and further education providers that aims to help Devon based small or medium-sized enterprises (SME) to identify skills gaps in their existing workforce and provide the skills training they need to become more resilient to economic crisis and beyond. Partners include CSW Group, City College Plymouth, South Devon College, Petroc, Focus Training, University of Exeter and Learn Devon. working, and techniques which help them innovate. In this case, ABB provided specialised infrastructure to the FEC, which then used it to train students and learners from industry.[43]

3.2.5 Support services

FECs can provide all sorts of supportive services and facilities and through these offers can have direct and significant impacts on innovation ecosystems. These include physical hubs such as business innovation centres, accelerators, enterprise zones, and business parks.[44] Other services they can provide are assistance with product and process development, market and feasibility assessments, mapping and strategy around education and technology needs, loan of equipment, data sharing, mentoring and reverse mentoring, and technological expertise.[45] Notably, 83% of colleges surveyed by the AOC felt that supporting SMEs was a high priority for economic impact and 42% felt they should play a role in supporting business innovation more generally.[46]

43 CSW (2021). "Smart Skills Hub." from https://cswgroup.co.uk/home/employers-and-adults/smart-skills-hub/.

44 Baxter (2019); Luke (2013).

45 Madgett, P., et al. (2005). "Clusters, innovation and tertiary education." Tertiary Education and Management 11(4): 337-354.; Toner and Woolley (2016).

46 Association of Colleges (2020)

While the support that FECs can offer to their business communities are quite varied and many FECs have these capabilities, not all of them advertise or bundle them in accessible ways. Aside from established and resourced programmes such as innovation centres (see Box 10), ad hoc arrangements tend to dominate. In some cases, FECs have dedicated business offices to serve as portals and brokers for interested businesses. Only 52% of FECs in the AOC survey reported having dedicated account managers to work with businesses on knowledge transfer and information dissemination, half had an office focused on delivering technical support to an industry, and only 28% offered specific services related to business planning.[47] Even with dedicated staff, FECs build these relationships through involvement in forums like employment boards where specific solutions can be discussed rather than firms coming to them independently for services. Things like technical expertise might be accessed on a one-to-one basis, through specific relationships, rather than being widely known among the local business community or even available at sufficient scale to impact innovation in the ecosystem.

Our interviews with FECs revealed some frustration about challenges in reaching businesses that might benefit from these services. FECs felt as though they could be effective partners but struggled to make firms aware of their capabilities or, often, to convince firms that they could benefit from accessing them. On the business side, there is a perception that interacting with external partners, such as FECs, may not yield sufficient returns on investment in either resources or time. This was particularly true amongst SMEs.

Box 10: Innovation Support in the South-West

South Devon College has two dedicated innovation spaces to support start-ups and business innovation, as well as supporting student learning. The spaces are the South West Energy Centre that has the capacity to host 10 businesses, and the recently established Hi Tech & Digital Centre (HTDC) that can accommodate up to 16 businesses. These spaces were designed with collaborative, industry thinking in mind, to promote engagement and collaboration. In designing the space South Devon College has sought to emulate how project teams operate, with digital and IT, coding, programming, creative media capabilities such all housed together in the same spaces. The creation of the space was in response to the demand from businesses looking for a full-service proposition in the innovation space, with access to technology, facilities, and support. The facilities were developed with manufacturing in mind, and include an engineering room with the latest CNC machining technology which are required in a modern manufacturing environment, as well as industry equipped sound recording booths, photography studio, video and editing studios used in the creative industries The vision of the South Devon team is to expand the number of businesses supported in the future, with 50% of the businesses created by students and leavers.

47 Ibid.

3.3 Summary

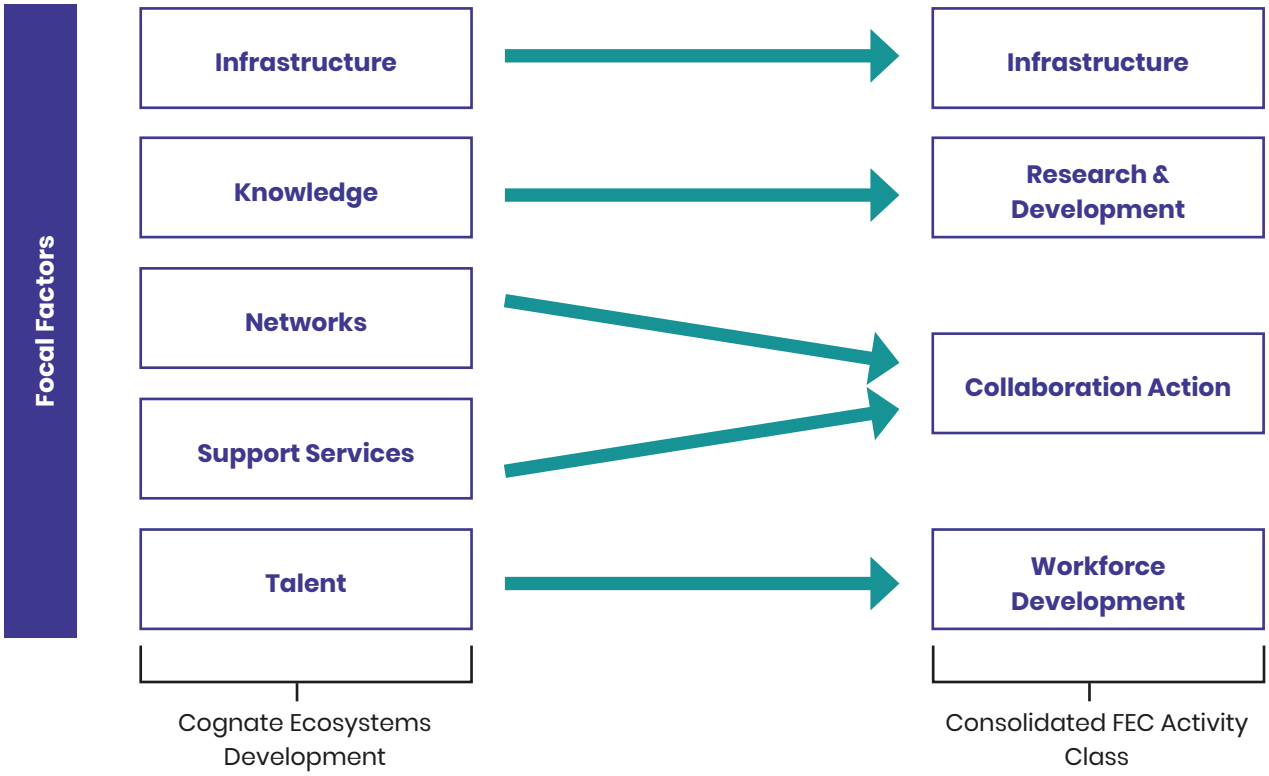
This section has presented the findings from the research, identifying the key elements of the ecosystem as they relate to FECs. The discussion of framing factors highlights the potential of FECs to take a leading role in their respective ecosystems, acting as a catalyst to change in promoting a culture of innovation. FECs already contribute significantly to their local and regional economies, although the prospect of CBCs mean extending the nature of this contribution beyond delivering qualifications. With the launch of the BEIS Innovation Strategy in 2021 there is a key moment for FECs in supporting businesses to develop their innovation capabilities that are highly aligned with central government policy agendas.

During the course of this research, we encountered several FECs where innovation was a more established focus. However, because of the funding mechanisms that exist, predominantly for capital expenditure and teaching, in many cases the FECs had to create and grow separate sources of funding to develop their innovation related activities. Of the FECs engaged in more innovation orientated activities, the offer tended to be limited in its focus and uptake, and there was scope to extend their offer. Indeed, the level of business awareness and engagement with FECs, even with this source of innovation expertise is low. Many of the FECs providing innovation support explained that there are not high levels of demand from SMEs, and of those engaged they are looking for certainty of a direct return on the time invested. That said, of the businesses more involved in accessing innovation support from FECs the value-added was well recognised, and although we hypothesise that while many more businesses could benefit they do not understand the opportunity or identify FECs as providing support to develop innovation capabilities of businesses.

In assuming a more prominent role in their local innovation ecosystem it is important to understand how FECs relate to the existing innovation system. This is essential to avoid deadweight loss and the duplication of functions provided by existing public and private providers, and thereby create a clear value proposition. Having a clear value proposition is crucial as colleges have neither sought nor been required to support businesses in this way at scale. As such FECs need to establish themselves in this space as a credible provider of choice that is outside of their typical domain as statutory education and skills provider. The discussion has shown how the offer of FECs can be seen to relate to seven elements of the ecosystem and that there is scope to extend this further through additional investment, such as the CBCs.

During the interviews it was apparent that while the elements of the ecosystem were relevant the academic nature and language of the ecosystem framework did not resonate with FECs. In Figure 3 the elements of the ecosystems are revised to better known classes of activity, and the elements of Networks and Support are also merged as a single class of activity. Building on these classes of activity the next section advances a framework in the form of a logic model to capture the process by which FECs are supporting businesses to develop their innovation capabilities. It is important to note that none of the FECs consulted were engaged in all of the classes of activity, and that it is reasonable to expect that they would not be at this point and may not be in the future.

Figure 3: From Elements of Ecosystems to Classes of Activity



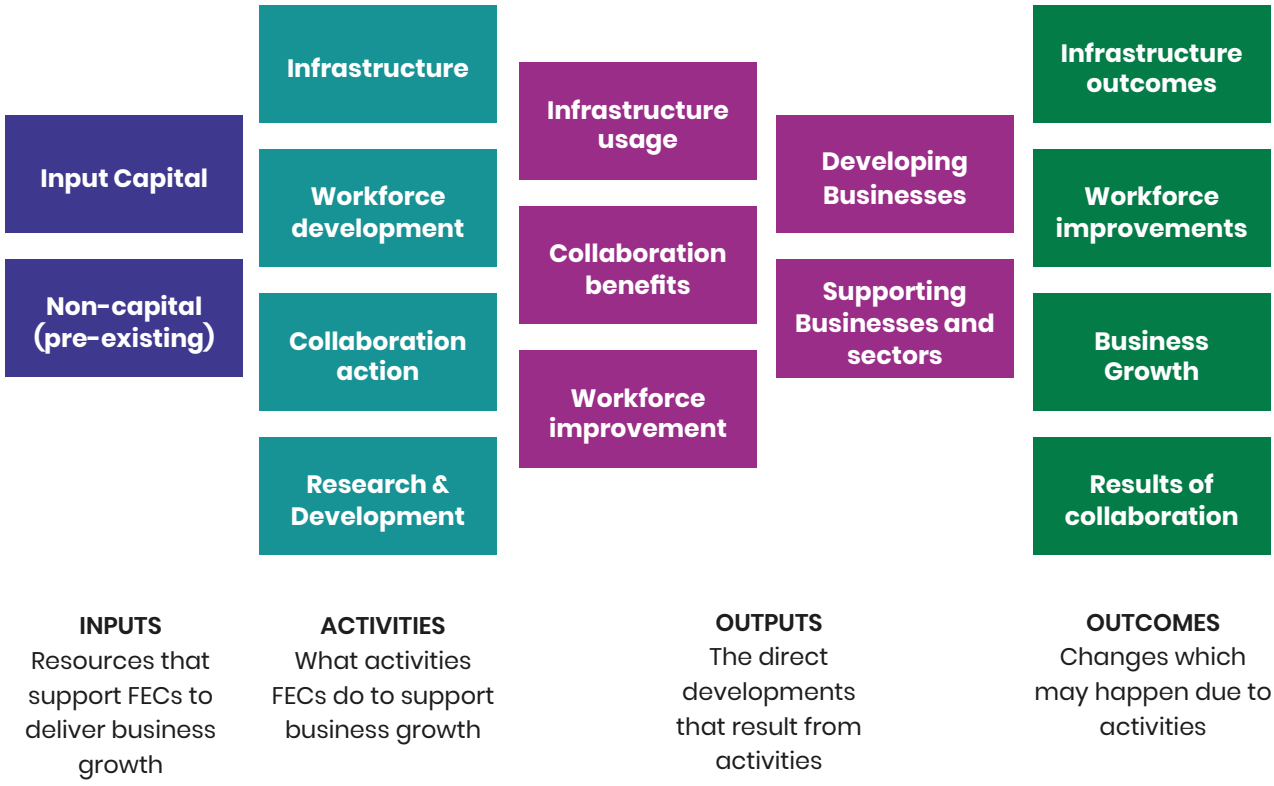
Arguably the most significant challenge, as alluded to in the introduction to this section relates to the question of demand for college to provide support to businesses in developing their innovation capabilities. For the majority of FECs that do not have any, let alone established streams of activity to support business innovation there is a need to develop their offering in terms of the services they can and will provide and then take them to businesses. This must be accompanied by a clear new-to-market strategy that highlights the extended offer of FECs, although this is likely to be difficult for many colleges given the fragmented nature of the business landscape. While the CBC pilot represents an important step for understanding how FECs can support businesses to develop their innovation capabilities, the activities implemented and outcomes achieved are likely to be limited in the period to March 2022.

4. ADVANCING A LOGIC MODEL

Based on the research findings and review of the existing literature this section advances a logic model that explains how FECs can support business innovation. The logic model outlines how the inputs, such as the additional resources associated with the LSIP/SDF funding for the CBC pilot, can enable a range of activities further to the existing educational activities of FECs. The relationships presented within the logic model are not necessarily linear, although are depicted as such in Figure 4 - that is to say inputs (i.e. resources and funding), enable activities (i.e. programmes and interventions), that can be captured as outputs (such as number of programmes and participants), and which lead and contribute to stated outcomes (such as higher economic growth and societal benefits),

In creating a logic model for FECs as engines for business innovation, we draw from a broader framework created by the Innovation Caucus to identify how FECs could contribute to supporting innovation-led growth. The model presented below in Figure 4 is intended to capture high level components, which are not intended to be prescriptive but rather be a starting point to identify FEC specific insights. The logic model deliberately excludes any reference to statutory teaching and education provided by the college given the focus is on the additionality that colleges can provide in terms of innovation-led growth.

Figure 4: Illustrative Logic Model



Individual FECs often have specialisms in addition to core educational provision, which sees them work and cooperate with different sectors related to their local and regional geographies. This is reflected in the different objectives and priorities in their education provision, which will impact how they support business innovation. As set out in the logic model, there may be common classes of activities, but specific types of activity should be adapted according to the specialisms of individual FECs and business need in order to better support innovation-led growth. Not all categories shown in Figure 4, as noted above, are likely to be relevant or applicable to all FECs. In elaborating the classes of activity and outcomes in the high-level logic model, Figure 5 presents a more detailed visualisation of the categories of activities and their associated outcomes. The specific activities and associated outcomes are discussed further below, and FECs may look to adapt this in a way that is meaningful to the organisation, to design and develop their plans as a part of the CBC pilot, and in supporting businesses to innovate more broadly.

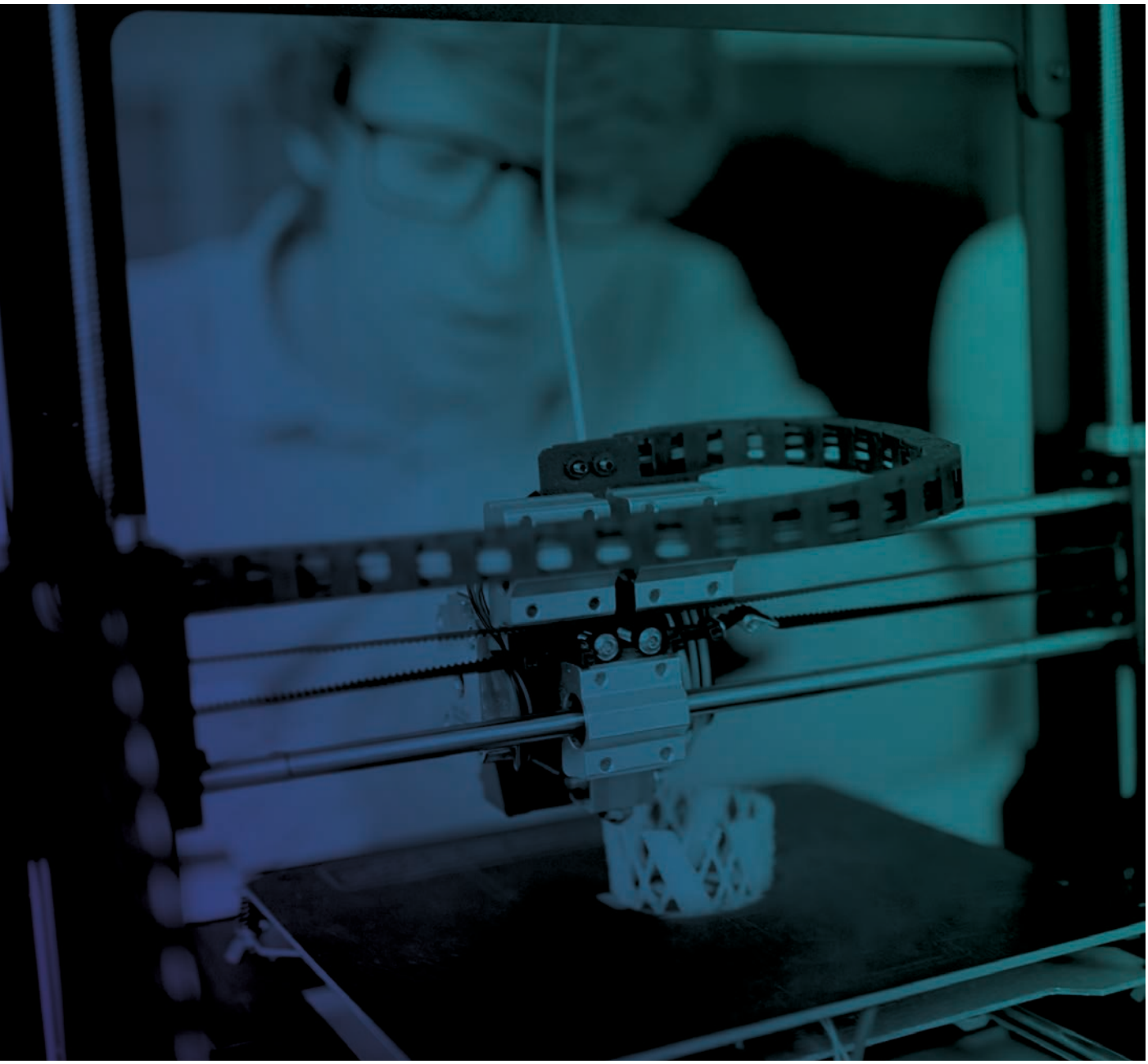
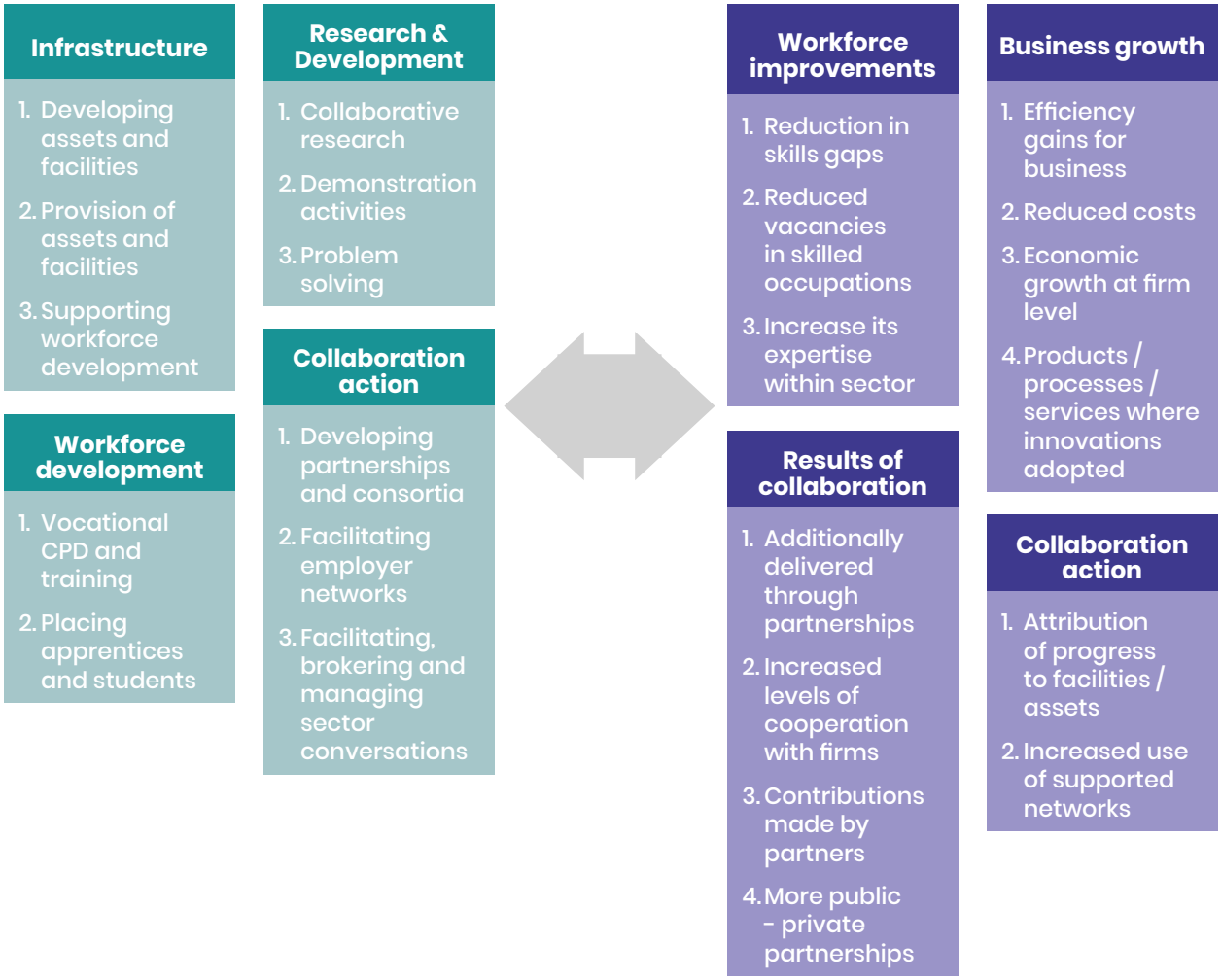


Figure 5: Elaborated Logic Model



The logic model conceptualised in Figures 4 and 5 was sense-checked through the interviews with FEC and business. As such, it offers insights into some of the ways in which FECs are supporting businesses beyond their role in delivering statutory education, as well as identifying how these roles could be extended. Using the proposed logic model framework to design and develop a strategy to support businesses to innovate can ensure that the action plans of FECs avoid a misalignment between activities and their intended outcomes. Supporting businesses to develop the capacity and capability to innovate is complex, and FECs are an emerging part of the wider innovation ecosystem, so it can be difficult to identify how all constituent parts relate and work fit together. By connecting activities and outcomes the logic model may help FECs avoid proposing activities that do not contribute to the intended outcomes, while also identifying anticipated outcomes for which there are no supporting activities.

5. CONCLUSIONS & NEXT STEPS

There is an opportunity for FEC to assume a more central role in their local and regional innovation ecosystem, supporting businesses to develop new capabilities to unlock opportunities for innovation-led economic growth. The allocation of LSIP and SDF pilot funding by DfE to support FECs in the creation of CBCs is an important step in resourcing FECs to be a catalyst to the innovation agenda and deliver enhanced levels of collaboration with employers - both of which align to the Government's new Innovation Strategy.

In much the same way that universities have been positioned as engines of innovation and economic development over the past two decades, there is scope for FEC to support business innovation in complementary ways. This resonates with observations made in a report by Nesta (2009) about the merit of supporting and expanding what was then referred to in terms of 'knowledge transfer' from FECs. The report noted that for many small businesses, FECs were better placed to help them be more innovative and profitable than universities. This opportunity still exists, and has arguably become more important.

In concluding the report, we offer several reflections on the role of FECs in their respective innovation ecosystem, which merit further consideration if the potential contributions of FECs are to be realised. They are:

1. The capacity of FECs is a key factor that determines the extent to which they can meaningfully support business innovation - currently FECs are neither designed nor resourced to deliver.
2. There is a need for FECs to better understand the innovation needs of local and regional businesses if they are to establish an appropriate and effective offer to support businesses in developing the capabilities to innovate and realise innovation-led growth.
3. As well as understanding business needs, there is a need to ensure that any offer by FECs complement and contribute to the existing provision within the ecosystem, which is already cluttered landscape
4. The focus of FECs needs to be on supporting existing and established businesses in developing the capabilities to innovate, as opposed to supporting the creation of new innovative start-ups.

5.1 Framing the Opportunity

Situating FECs to play a more prominent role in innovation ecosystems requires interdepartmental and interorganisational coordination. In delivering on this agenda there is a need to recognise and articulate how the opportunity can be delivered through the collective commitment of BEIS, DfE, Innovate UK and the Gatsby Foundation. More specifically:

- for BEIS, the central government department owning the Innovation Strategy, FECs have the potential to contribute across the four pillars. Perhaps unsurprisingly there is only fleeting reference to FECs in the Innovation Strategy, and only in relation to skills. However, in supporting the creation of College Business Centres, BEIS aims to build connections between FECs and local businesses in priority sectors. These present an opportunity to stimulate innovation by gathering intelligence on skills gaps, helping employers invest in skills, identifying and socialising new technologies and innovative practices, and nurturing entrepreneurship.

- for Innovate UK the Innovation Strategy and concurrent launch of their new corporate strategy, positions them centrally. As the government's innovation agency, Innovate UK have been central to delivering the Government's agenda. Innovate UK have a reputation for working with innovators at the frontier, yet in the new strategy there is an increased remit for Innovate UK across the four pillars. Of particular relevance to Innovate UK with respect to the role of FECs in the innovation ecosystem is their heightened regional role and the emphasis on the diffusion and adoption of innovation. This represents a major shift and extension in the remit of Innovate UK, and there is a significant opportunity with respect to the role of FECs. If empowered to do so, FECs have a potentially transformative role in driving the innovation ecosystem. In fostering the diffusion and adoption of innovation, Innovate UK are growing the depth of innovating businesses which also serves to increase the impact of those businesses working at the innovation frontier.

- for DfE, as the central government department leading on the skills agenda, there is an opportunity to see FECs contributing beyond skills provision. The LSIP/SDF pilots will ensure that the skills of FECs meet the needs of local employers and target skills gaps, as well as driving the innovation agenda more widely. Arguably the role of FECs has and continues to evolve, and through the creation of College Business Centres continues to significantly contribute to the ambition of the Innovation Strategy to see the UK become a global hub by innovation by 2035. This new direction for FEC is an extension of the role as

a skills provider to include more applied outcomes in building the innovation capacity of businesses.

- for the Gatsby Foundation, a charitable philanthropic foundation, which is committed to strengthening the country's science and engineering skills. In the Innovation Strategy, the Gatsby Foundation is committed to supporting FECs to identify and address the emerging skills needs of industry partners. Closely linked to the skills need of employers, often understood in technical terms by FECs, is the innovation capabilities in firms. The Innovation Strategy is committed to increasing the number of firms who engage in innovation, and to achieve this there is a need to increase the provision of innovation-related skills that are outside of the prevailing skills and training system.

- for FECs, and the Association of Colleges, there is an opportunity here to further advance the role of colleges beyond post-16 education, work-based learning, adult and community learning. While some colleges are already engaged in supporting business through a variety of different activities, these are not regarded as the core role of FECs. Through the creation of College Business Centres there is an opportunity through the LSIP/SDF pilots to promote a wider change in the positioning of FECs as contributing to local and regional economic development. While FECs are already established as anchor institutions in their role as a skills provider, there is scope to extend this by supporting firms to develop their innovation capabilities in firms. In the short term there is a need to change the perceptions of FECs as a source of support for business innovation and to stimulate demand for such provision.

5.2 Further Support & Research Needs

There is an imminent window of opportunity to both support those FECs participating in the LSIP/SDF pilot that will be looking to establish CBCs. While acknowledging that the EOIs submitted to DfE identify priorities and outline the intended approach, there is scope to work with the FECs selected to ensure that they are supported in operationalising their plans. The nature of this support could be threefold:

1. Develop facilitated action learning sets of those FECs participating in the CBC pilot. Given that this is an emerging role for many FECs, and that they are not competing for the same businesses that they are looking to support, there is an opportunity to benefit from peer learning.

2. Given the need for FECs to better understand their ecosystem and business needs, there is scope to develop a process to support FECs in undertaking this exercise. There is also an opportunity to do market research to understand how to position the offer from FECs as part of the innovation ecosystem.

3. As well as understanding business needs, there is a need to ensure that there is a clear evaluation and evidence framework in place that FECs can use to capture and demonstrate the activities, outputs and outcomes of the CBCs and broader business innovation support. There is scope to create a common approach to support FECs

Innovation Caucus

RETHINKING THE ROLE OF FURTHER EDUCATION COLLEGES IN INNOVATION ECOSYSTEMS

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