South East Technological University

School of Science and Computing

Department of Land Sciences

Knowledge & Skills Needs in the South East

A focus on the Agriculture, Food, Forestry, Horticulture & Marine sectors

January 2024

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INSPIRING FUTURES

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1. Snapshot of the bioeconomy sector

There is little disagreement as to the importance of the agri-food, forestry, horticulture and marine sectors in Ireland with most recent data clearly highlighting the importance of these sectors to the economy from a national and or regional perspective. For the purpose of this report these five sectors collectively will be referred to as the bioeconomy sector as represented below (Fig.1).

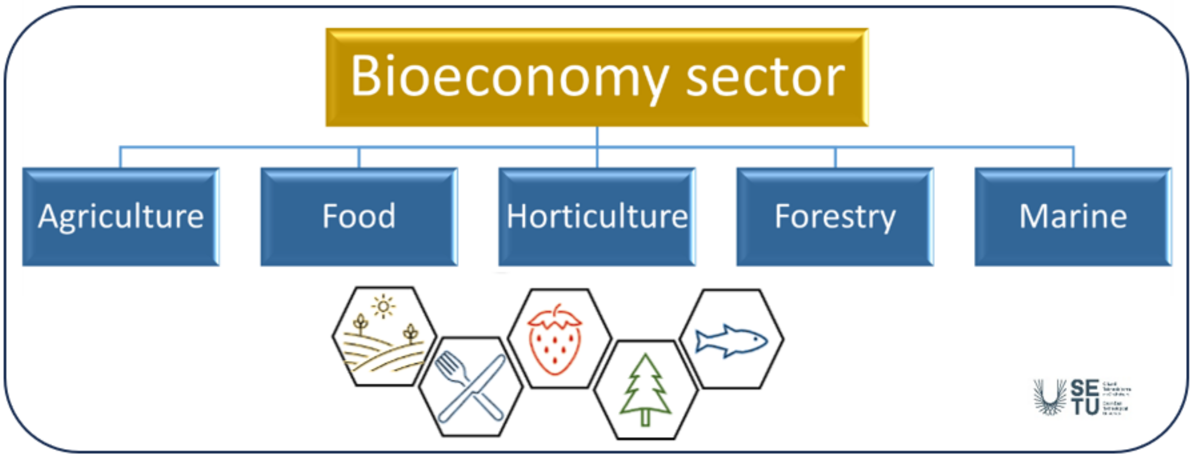

Figure 1 Bioeconomy sectors.

Most recent figures indicate our agrifood sector employs approximately 170,400 people and has an annual turnover approaching €30 billion with food and drink exports valued at almost €17 billion in 2022. Our forestry sector supports either directly or indirectly approximately 9,400 jobs and contributes approximately €2.3bn to Irish GDP annually. The horticulture sector is the 4th largest sector within agriculture, with a farm gate value in 2020 of €467m. Our Marine sector is responsible for employing approximately 15,373 people and is made up of a combination of 1,993 registered fishing vessels, 296 aquaculture sites nationally across a network of 101 seafood processors contributing a reported 1.3bn GDP.

Notwithstanding an array of recent challenges, the majority of sectors are positively positioned. A large portion of our agrifood exports experienced a very welcome expansion with beef, sheep meat, pig meat and poultry driving much of this increase across this sector. Cereal exports increased in value however volume exports year on year decreased in 2022. Many horticultural sectors demonstrated resilience or slight declines, however certain products including foliage increased during this period. While volume of seafood exports declined in 2022 export value increased by year on year comparison 2021 to 2022. While there may be slight variations in performances the importance of the bioeconomy sectors to the Irish economy cannot be underestimated in terms of its combined monetary value, employment as well as its regional impact in terms of community cohesion and local and regional impact.

In the context of the South East of Ireland the importance of the bioeconomy sector is clear with CSO data showing the region accounts for 17% of agricultural output with estimates suggesting it represents a similar proportion of employment. The region is home to several large-scale food manufacturers and a vibrant cohort of SME enterprises all of which have varying needs. Most recent information from Ireland South East highlights the importance of the agri-food sector in the region and demonstrates the array or opportunity and potential on offer within this sector locally. The bioeconomy sector in the South East can be numerically represented as follows

- 13,600 people working in the Agriculture, forestry and fishing sector in the region.
- Over 6,000 people in Ireland South East have a third level qualification in Agriculture or Veterinary.
- 700 students from South East are enrolled in Agriculture, Forestry, Fisheries and Veterinary.
- An array of courses currently being offered at South East Technological University, Higher Education Institutions with a further 500 students enrolled in the Kildalton Teagasc campus.

This the South East bioeconomy forms the backbone of sustainable communities while also supporting local employment, community development as well as social and infrastructural development. It is essential towards local and national prosperity and forms a core part of Ireland’s indigenous economy.

2. Acknowledgements

This document has been jointly funded by Enterprise Ireland under the Regional Enterprise Innovation Scoping Scheme (REISS) – Feasibility Grant 2022 (177679/RI) in partnership with financial support from local industry partners and members of SETU Department of Land Sciences Industry Board.

The authors would also like to thank Martin Corkery, Brian Fives (Enterprise Ireland), Edmond Conolly (South East Regional Skills Forum), Alan Quirke and Richard Hickey (Ireland South East) for their assistance and support at all stages. The authors would also like to acknowledge the support and assistance of the staff within the Department of Land Sciences, SETU.

Finally, the authors also wish to thank the following contributors for their time and effort during the external engagement stages.

- Padraig Brennen Consulting
- Alpha Omega Consultants
- CCF Management / Professor Jim Mc Adam

The authors wish to acknowledge the financial support received from the partners

3. The role of South East Technological University

South East Technological University (SETU), in its Research for impact document sets out a roadmap for its mission to deliver for the South East of Ireland through a revision and reorientіon of its curriculum, transformation of its operations and mobalisation of its community towards a thriving, sustainable, and outward looking region. SETU has committed to driving impact through enhanced emphasis on clustering, smart specialisation and the building of critical mass in key industries and across sectors including, amongst others, agriculture (including agritech, food, sustainable agriculture), forestry, horticulture and marine.

This report demonstrates the Universities awareness of and willingness to support this broader Land Science community and its many stakeholders on their journey towards NetZero in a circular economy while underpinning and strengthening the regional ability to adjust and cope with potential effects of national and international economic uncertainties. It presents a collective desire across the University and Local stakeholders to progress advanced engagement in several key areas of strategic importance which include national and European climate change, sustainability, and the circular economy, including initiatives to re-engineer supply chains for resilience from global or geopolitical crises.

Currently there are a range of knowledge, skills, solution and service gaps which need to be addressed regionally, nationally, and internationally. SETU, in its strategy document sets out its ambitions to deliver highest quality teaching on programmes that meet the needs of the industry and society of the region and also perform world class research that creates new opportunities for the region while engaging with the challenges faced by the south east. This report sets out a collaborative framework to support SETU on its journey towards enhancing its performance across teaching, research & innovation, and engagement to enable and sustain the south east as a world-class innovation region delivering transformative impact for our community, our region, and the wider world. This report will promote and instill in all who engage the values and ambitions of a sustainable and inclusive future for all on our journey towards a low carbon economy and Ireland’s net-zero ambitions

4. Purpose of this document

National as well as international agriculture, food, forestry, horticulture and marine sectors are experiencing an array of unprecedented environmental, social and policy challenges. To address these challenges requires firstly identifying and secondly refocusing of certain sectoral norms. The purpose of this report was to engage local and national stakeholders across several key land sciences disciplines including agriculture, food, forestry, horticulture, and the marine to capture current sectoral sentiment in this time of change in terms of challenges, opportunities and requests currently being placed on these sectors.

Section 5 of this document identifies and lists the key findings of a comprehensive knowledge gaps and skills needs analysis conducted in Q 1 - 3 of 2023 across agriculture, food, forestry, horticulture and marine stakeholders across the South East of Ireland. Based on these findings this report sets out the requirements of partnering for impact (Section 6) which details the request and / or requirements from stakeholders to ensure any collaborations will remain in line with and ahead of market demand and sectoral expectations nationally and internationally to retain and / or rebuild local and national competitiveness. Section 7 “Key industrial call outs” continues by listing five key industrial call outs which need to be considered before it is possible to be in a position to address the knowledge gaps and skills needs. Finally, as a direct result of the interviews conducted, section 6 lists the mechanisms of how key stakeholders feel solutions can be delivered to their organization to ensure they remain assessable and fit for purpose.

Through the identification of knowledge, skills, solutions and service gaps in the South East across an array of sectors it is expected that this document will assist in formulating a multistakeholder roadmap designed to better serve the education and skills needs as well as expand the research and knowledge capacity both in the South East and nationally. It is hoped that this report, through firstly identifying these challenges will assist the early-stage development of initiatives that can help strengthen the regional ability to adjust and cope with the potential effects of international economic changes that may impact the regions or sectors performance. It is further expected that the findings of this report will promote and instill in all who engage the values and ambitions of a sustainable and inclusive future for all, whilst promoting enhanced resilience across the local and national region. It is also expected that it will assist stakeholders play a part in supporting Ireland’s requirement to transition to Net Zero and achieve a climate neutral economy under the Climate Action plan 2023 as well as support local and national alignment with the EU roadmap for Europe becoming a climate-neutral continent by 2050 under the European Green Deal.

5. Challenges facing the bioeconomy sector

The Irish agri food, horticultural, forestry and marine sectors have demonstrated clear resilience in recent times and have proven an ability to adapt to an array of challenges. Going forward it is widely accepted that both the market and policy demands facing these sectors, over the next number of years will be challenging to implement. The post pandemic return to business as usual coupled with an array of ambitious climate targets and a heightened level of political unrest across the globe have significantly impacted "business-as-usual" trade of products as well as raw materials required for production. This combination of factors has created a heightened level of uncertainty across markets resulting in investment uncertainty and supply chain and trading challenges.

Radical change is required to address these challenges and remain akin of both policy and political challenges. A set of solutions must be implemented to address the knowledge, skills, solutions, and service gaps which need to be addressed regionally, nationally, and internationally. In Ireland, Food Vision 2030 clearly articulates the ambition of the Irish food and drink sector to become a world leader in sustainable food systems over the next decade and deliver benefits for the sector, Irish society, and the environment. Food Vision calls out four high level missions to deliver on its ambition, namely:

- A climate-smart, environmentally sustainable agri-food sector
- Viable and resilient primary producers, with enhanced wellbeing
- Food that is safe, nutritious and appealing, trusted and valued at home and abroad
- An innovative, competitive and resilient sector, driven by technology and talent

The ambitious and innovative roadmap for the agri-food sector aims to grow agri-food exports from €14bn to €21bn by 2030. The focus on securing a viable supply chain that's working towards climate neutrality, increased investment in innovation and technology to drive value creation and a further emphasis health and nutrition provides clear policy direction for the sector.

In September 2023, following an extensive period of engagement and consultation Ireland's Forestry Strategy 2023 – 2030 was published. The objective of this report is to urgently expand the national forest estate on both public and private land in a manner that will deliver lasting benefits for climate change, biodiversity, water quality, wood production, economic development, employment, and quality of life. This ambitious vision will result in a more widely forested country with multifunctional and diverse forests delivering multiple benefits for climate, nature, wood production, people, communities, the economy and rural development.

Many of the policy documents have been set out and now is the time to position and equip industry and society with the knowledge, skills, solutions, and services required to meet these targets and continue to function competitively globally.

6. Knowledge gaps and skills needs

As a result of an extensive industrial consultation process several key sectoral insights and learning outcomes have been identified across all 5 bioeconomy sectors examined namely agriculture, food, forestry, horticulture and marine. This comprehensive list of knowledge gaps and skills needs common to all sectors and grouped into 6 priority areas are listed below:

- Sustainable systems
- Capacity to absorb research and innovation
- Availability of skilled employees
- Leadership development
- Market development
- Digitalisation

These 6 key priority areas have been further expanded to contain a list of specific challenges listed below. Additional to this, a list of learning & solutions requisite, represents an industrial perspective on the requirements of a solution towards addressing these knowledge gaps and skills needs (Figs 2, 3, 4, 5, 6 & 7). Listed according to priority area the specific challenges include:

6.1 Priority Area 1: Sustainable systems

Given our long standing and extensive national family farming tradition it is generally accepted that we are starting from a relatively high point but recognise certain limitations. While all interviewees recognised the importance of addressing climate change challenges within their business, it is clear from discussion that knowledge of sustainable production systems is at the early stages of development in many cases, particularly in relation to measurement and impact hot spots. There is currently a gap in terms of placing all elements of sustainability (environmental, economic and social) at the heart of business strategy. There is a strong interest in embracing the circular and bioeconomy across all sectors examined. Opportunity in this space spans the full agri-food sector from farm, fishers, forestry, input suppliers and food & drink producers. Knowledge and skills gap identified in this space range from farm / primary production all the way through to the final product.

Specific Challenges

- Current limited understanding of the **carbon cycle** (Scope and function)
- Limited in-house understanding of **measurement** & **hot spot analysis**
- Current knowledge of **Sustainable land management** best practice in 'early stages'
- Current requirement to build stronger understanding of **bioeconomy** opportunities
- Target areas that require additional resourcing **(People and knowledge)**

Learnings & Solutions requisite

- **New knowledge needs to be built from the ground up**
- **Put sustainability at centre of business strategy needs to become normalised**
- **Real need to identify cutting edge research and technologies that can be applied by sector**
- **Identify opportunities to foster partnerships to deliver sustainable solutions**

Figure 2 Priority Area 1: Sustainable systems – Challenges, learnings and solutions requisite.

6.2 Priority Area 2: Capacity to absorb research and innovation

The capability and capacity along the value chain to absorb research and invest in product and process innovation appears to vary considerably across interviewees. Across all sectors a clear recognition exists for the need for process automation and digitalisation was evident however in many cases the skill set and expertise to deliver on this is limited. This limitation is directly impacting on the ability of the sector to implement system and process innovation and pursue the adoption of emerging technologies.

Similarly, there appears to be a major variation in the capability and resources available across sectors, as well as within sectors for new product development. This has resulted in most innovation continuing to be incremental in nature thus lacking impact and return. A consistent theme coming through from the interviews was that larger companies generally had sufficient resources in place to deliver market led innovation while SME's struggled to be in a position to dedicate the time and resources needed to this area.

Specific Challenges

- Automation needed at all levels to drive competitiveness but challenging to implement
- Challenge existing "incremental" product innovation, particularly in SME's ecosystem
- Product formulation to meet different market needs a key skills need

Learnings & Solutions requisite

- **Mechanisms to address diverse capability/capacity identified during interviews**
- **Assist SME's to build capacity to innovate on ongoing basis**
- **Innovation 'asks' span full supply chain – non incremental**
- **Support Innovation at all stages - increasingly critical at farm level**

Figure 3 Priority Area 2: Capacity to absorb research and innovation - Challenges, learnings and solutions requisite.

6.3 Priority Area 3: Availability of skilled employees

There was a consistent view expressed during the interviews that the first issue that needs to be tackled is the perception of the bioeconomy sector. Effort is required to make it a more attractive option for potential employees across all levels. Directly linked to this and a major key concern that emerged from interviews was the ongoing challenge of being in a position to attract and retain skilled employees in the region.

Specific Challenges

- Lack of skills limit ability to add value
- Requirement to identify new ways to invest in staff (Languages / Market tastes and preferences / selling skills)
- Challenge the perception "other sectors offer better opportunities and work/life balance"
- Need to create stronger links with third level institutions through formalised placement programmes
- Promote and support a strong commercial mindset across graduates

Learnings & Solutions requisite

- **Address frustration at loss of workforce to other sectors**
- **Support for strong 'on the job' element to upskilling**
- **Strong willingness to invest in people at ALL levels but also needs to benefit the company**
- **Explore offerings of local tailored solutions for employee training and upskilling**
- **Increased awareness regarding succession at farm level – absence of farm management courses**

Figure 4 Priority Area 3: Availability of skilled employees – Challenges, learnings and solutions requisite.

6.4 Priority Area 4: Leadership development

All interviewees expressed a strong desire across all sectors to accelerate leadership within their organization. There remains a strong desire to secure graduates and / or experienced managers with a practical, commercial mindset with an ability to identify the practical implications and opportunities presented by research in a way that help businesses grow.

Coupled with this is also a strong need to develop skills and leadership in the regulatory environment. These sectors are operating in a rapidly changing market and regulatory environment. The new trading relationship between the EU and the UK has brought increased complexity to day to day business for Irish food producers. Similarly, climate related regulations and reporting requirements are evolving at a significant pace. Interviewees highlighted the need to develop staff with the skills to understand evolving regulatory requirements and be able to anticipate the potential impact on their supply chain across the business.

Specific Challenges

- Investment in management development needs called out consistently
  - Strategic planning - Create time & space to think and engage with peers
  - People management
  - Driving supply chain value
- Other areas called out include risk management, regulatory knowledge, 'Big Data'
- Targeted focus on developing future leaders

Learnings & Solutions requisite

- **Ensure constant and consistent view on the creation of middle management pipeline from within**
- **Target tailored solutions that fit their business needs**
- **Alternatives to loss of staff for 'blocks of time'**
- **Desire to develop people with skills to adapt to evolving market/regulatory requirements**

Figure 5 Priority Area 4: Leadership development - Challenges, learnings and solutions requisite.

6.5 Priority Area 5: Market development

As the bioeconomy sector focuses on creating and capturing value from the marketplace, there is a need to ensure that the sector is equipped with the knowledge and skills needed to identify and develop new market opportunities. Identifying such opportunities requires access to insights and intelligence in relation to potential geographic markets as well as different channels within existing markets. A call out to emerge during interviews was the recognition of the need for the sector to enhance its internationalisation skills. This includes building an in-depth understanding of language / business, culture, tastes & preferences, doing business internationally and international selling skills. Many medium and smaller exporters that have traditionally relied on markets such as the UK tend to have limited resources and knowledge of potential markets across the continent of Europe and beyond and have expressed a strong desire to acquire such knowledge.

Specific Challenges

- Need to enhance and broaden internationalization skills
  - local tastes & preferences
  - product formats,
  - business culture and language skills

Learnings & Solutions requisite

- **Address challenge of SME's being too removed from the marketplace**
- **In house capacity to invest in market development limited in most cases**
- **Target the 'one size fits all' approach to servicing different markets**

Figure 6 Priority Area 5: Market development - Challenges, learnings and solutions requisite.

6.6 Priority Area 6: Digitilisation

The era of digitalisation continues to emerge strongly and is quickly becoming a "must know" as opposed to a competitive advantage across all sectors. There are a number of elements to the area that merit consideration. However, interviewees expressed strong concerns in this space due to a lack of knowledge in terms of requirements, requisites and potential value adding post adoption. While the general term of digitalization is understood it is felt that the business areas that would benefit from adoption are less clear. Interviewees felt that the areas of their businesses that would directly benefit from adopting digital include automation, enhancing transparency across the supply chain, increased data capture and reporting and marketing skills. Within this space there was a strong willingness and curiosity to explore other business areas that may potentially benefit.

Specific Challenges

- Challenges keeping up with Digitalisation
- Requirement to gain skills in digitalization in social media marketing
- Need to deliver enhanced transparency across the supply chain
- Enhanced data capture and reporting needed

Learnings & Solutions requisite

- **Most companies at early stages of this journey and require support**
- **Significant lack of skills called out across all business elements (lessons from other sectors)**
- **Emerging customer asks in relation to 'big data'**
- **Ability to embed social media marketing skills in business limited in most cases**

Figure 7 Priority Area 6: Digitalisation - Challenges, learnings and solutions requisite.

7. Partnering for impact

Given the diversity in terms of scale, competence and focus of the organisations interviewed during this initiative there is an inevitable variation in views, requirements, and expectations with respect to the design and scope of a solution across the sectors within each priority area. Post interview a subsequent mapping exercise was undertaken to identify areas where there was a high degree of agreement (in terms of views, requirements, and expectations) in relation to potential solutions that could be delivered to overcome the challenges and knowledge/skills deficits across all sectors (Fig. 8). The success of these solutions will be their ability to remain in line with and ahead of market demand and sectoral expectations. To achieve this, it is essential that all solutions consider the following three elements throughout design and development.

People – A continued sectoral specific focus on attracting and investing in supporting the creation of and continued access to a skilled workforce in the South East and beyond to support a constant supply of a future talent pipeline.

Knowledge – Targeted investment in industry focused research to support the creation of and continued access to capability and capacity building in the South East and beyond.

Access to expertise – Local access to expertise for engaging facilities to promote competitiveness at national and international level. There needs to be clear 'go to' contacts in the South East to provide a network and community to strengthen collaboration and support innovation. There were consistent callings across interviewees to resource additional capacity within SETU to exploit scope for greater industry engagement.

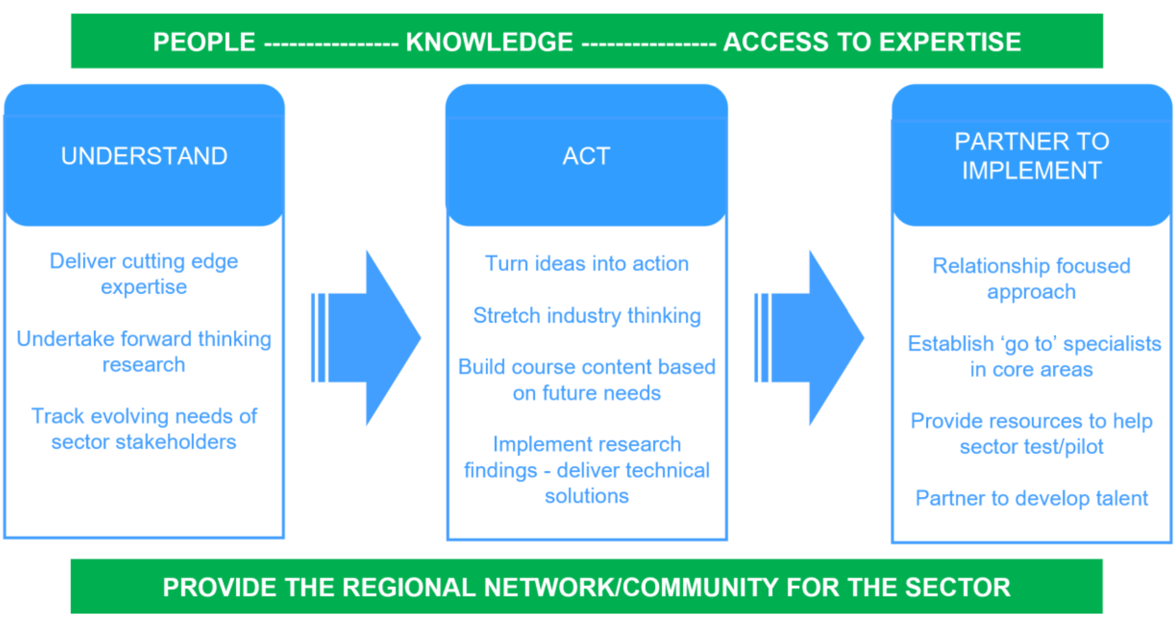

Figure 8 Pathways to support partnering for impact.

8. Key industrial call outs

Key to addressing and overcoming the array of cross sectoral challenges requires an ability to link solutions to an existing process within the organisation. Listed below are five key industrial call outs (Fig. 9) including a brief explanation of the context of each which need to be considered to be in a position to address the knowledge gaps and skills needs (Section 5) highlighted in this report.

Figure 9 Key industrial call outs.

8.1 Implement structures to establish a strong talent pipeline

There is a strong desire across all sectors to accelerate leadership within the organisation. There is a clear need to invest in upskilling and multiskilling of employees to help better develop existing talent 'in house' while also investing in and attracting in new people in an effort to create new organisational value. There is a consistent requirement for training and upskilling to be conducted through a combination of "in classroom" and "on the job" training. A consistent concern raised across all sectors is the concept of "sectoral image". It is felt that existing graduate cohorts gravitate away from agriculture, food, forestry, horticulture, and the marine sectors. Attracting and retaining a sustainable talent pipeline remains a real challenge for the industry across all levels of the organisation. Key challenges with respect to the availability of talent include:

- A lack of operators and technicians (In many instances it is important to note this challenge has also been presented as a 'labour' shortage and not solely a 'skills' shortage).
- Current lack of capacity to support "in company" capability to accelerate market development
- A lack of a skilled technical capacity to absorb new research and innovation
- Inability to attract in and or develop mechanisms to internally generate managers of the future
- Current lack of both the technical and softer skills at all levels across all sectors

There remains a strong desire to secure graduates and or experienced managers with a practical, commercial mindset with an ability to identify the practical implications and opportunities presented by research in a way that helps businesses grow.

8.2 Focus on current & long term sectoral needs

In a post pandemic environment and trading challenges due to political unrest a heightened focus has been placed on both the current and long term sectoral needs. A major need across all sectors examined includes infrastructural as well as operational competitiveness. Irish infrastructure costs such as labor, energy, waste, and compliance tend to be significantly out of step with many of the sectors EU competitors which, in many instances render the Irish sectors at an international competitive disadvantage. Such realities highlight a clear need to drive investment in production efficiency through technology, supply chain management and product formulation. Accessing and diversification of export markets remains a key area where in particular food businesses are seeking support to overcome challenges associated with cultural difference and access to relevant consumer and market insights.

8.3 Critical leadership to challenge current thinking

A key challenge across all sectors is the creation of a culture that will directly challenge current "sectoral norms" to address the knowledge gaps and priority areas outlined in this report. Such leadership will be required to challenge all aspects of the value chain incorporating process, product and a system wide perspective to reposition each sector at the center of national policy and core to the national strategic future of Ireland and position Ireland in a position of global leadership.

8.4 Research with focus on industry application

The capability and capacity across each sector examined to absorb research and invest in product and process innovation seems to vary considerably. There is a very clear desire across all sectors to engage in research and development initiatives however not all sectors and or company structures / sizes have the long term resources to assign to such initiatives or many lack the "in house" skills and "know how" to engage in research. In many instances a lack of skilled employees or a lack of customer insights and trends to support research and innovation has also been highlighted. These challenges have been identified as a key barrier to adoption of scaled research and prevent organisations shifting from incremental towards transformative product and or process innovation.

8.5 Drive innovation with impact across supply chains

A recent Bord Bia readiness survey reported that 85% of respondents rated innovative capability as being very important to the future success of their business. There appears to be a wide variation in the capability and resources available for new product development with most innovation, similar to research, continuing to be incremental in nature. A consistent theme coming through the interviews was that larger companies generally had sufficient resources in place to deliver market led innovation while SMEs struggled to be able to dedicate the time and resources needed to this area. There is a clear need and strong desire to engage in both product and process innovation with the potential to span across national and international supply chains.

9. Spectrum of solutions

The purpose of this report was to engage the local industrial community across several key land sciences disciplines including agriculture, food, forestry, horticulture, and the marine to capture current sectoral sentiment in a time of significant change. This was carried out to assist the authors and sponsors to identify the knowledge, skills, solution and service gaps currently existing in the South East of Ireland. The hope is that this will directly assist in formulating a roadmap across stakeholders designed to better serve the knowledge, skills, solution and service needs as well as expand the research and knowledge capacity both in the South East and nationally.

Firstly, during interviews the interviewees were asked how they feel solutions can be delivered to their organisation within the context of the knowledge gaps and skills needs (Section 5). Using this information coupled with the requirements of "Partnering for impact" (Section 6) and key industrial call outs (Section 7) the schematic below represents the spectrum of solutions proposed by the industrial community in the South East of Ireland to address the current and future challenges (Fig. 10).

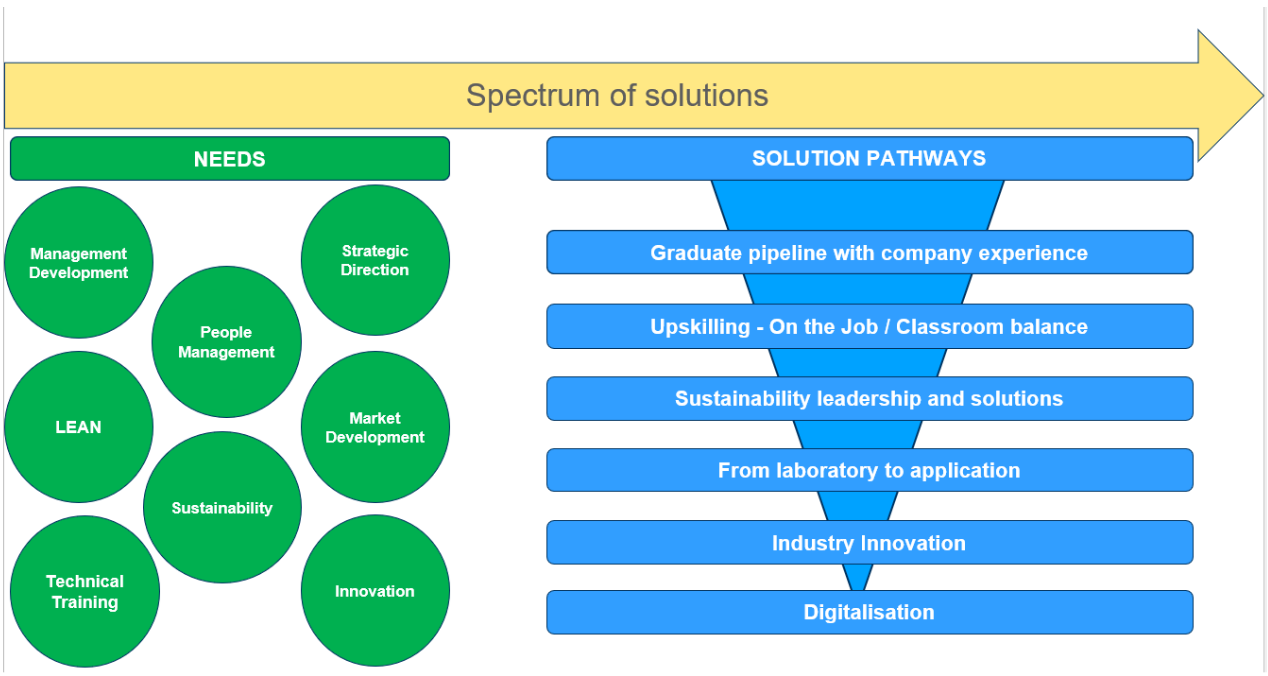

Figure 10 Spectrum of solutions.

10. Appendices

Appendix 1: Industrial sector call outs

This report has presented the findings of a multi sectoral investigation to assist in identifying the knowledge, skills, solution and service gaps currently existing in the South East of Ireland. The results presented represent the primary call outs from a combination of the sectors however given the diversity and complexity of each sector there were also a number of sectoral specific call outs identified which are presented below according to individual sector.

Listed below are a series of word cloud presentations containing a list of the common and recurring themes consistently mentioned during interviews. Each sector examined (agriculture, forestry, food, horticulture and marine) has a dedicated word cloud. While there are a number of call outs specific to each sector it is evident from section 5 there is significant crossover and similarity in terms of sectoral needs across the South East.

Sector 1: Sector Specific call out: Agriculture

** larger text size = more often mentioned during interviews / smaller text size = less often mentioned during interviews

Figure 11 Sector Specific call out: Agriculture.

Sector 2: Sector Specific call out: Food

** larger text size = more often mentioned during interviews / smaller text size = less often mentioned during interviews

Figure 12 Sector Specific call out: Food.

Sector 3: Sector Specific call out: Forestry

** larger text size = more often mentioned during interviews / smaller text size = less often mentioned during interviews

Figure 13 Sector Specific call out: Forestry.

Sector 4: Sector Specific call out: Horticulture

** larger text size = more often mentioned during interviews / smaller text size = less often mentioned during interviews

Figure 14 Sector Specific call out: Horticulture.

Sector 5: Sector Specific call out: Marine

** larger text size = more often mentioned during interviews / smaller text size = less often mentioned during interviews

Figure 15 Sector Specific call out: Marine.

Appendix 2: Recognition of existing national Initiatives

The purpose of this report is to assist in formulating a multistakeholder roadmap designed to better serve the education and skills within the bioeconomy as well as expand the research and knowledge capacity in the South East and nationally. This has been achieved through an in depth multisectoral investigation into the knowledge, skills, solutions and service gaps across the bioeconomy sector.

In the context of providing solutions it is important to highlight that there are a number of active national initiatives in place to address a number of the knowledge, skills, solution and service gaps identified in this report. In the interest of clarity and in recognition of the success of such initiatives it is important to mention them. A select number of these initiatives include a number of key sectoral specific apprenticeship schemes such as the Horticulturist apprenticeship as well as farm management apprenticeship program currently being delivered through Teagasc. Similar initiatives include the Teagasc signpost programme which is a national campaign designed to lead and support the transition of Irish farming towards more sustainable farming systems. It is expected that the findings of this report in combination with these and other similar initiatives will assist Ireland's requirement to transition to Net Zero and achieve a climate neutral economy under the Climate Action plan 2023 as well as support local and national alignment with the EU roadmap for Europe towards climate-neutrality by 2050 under the European Green Deal.