# Research Bulletin 23/6 | Innovation Driven Entrepreneurship and Northern Ireland

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## Summary

The 10X Vision emphasises the importance of innovation to long-term economic outcomes. A central pillar of the vision relates to the engendering of large scale change in the way that innovation is viewed, undertaken, and implemented within Northern Ireland (NI). It is hoped that this will lead to such activity becoming the driving force behind growth over the next decade.

The 10X Vision recognises the need to ensure that innovation activity is as widespread across the NI business base as possible. At the same time, it acknowledges the importance of facilitating a select group of highly innovative firms, often referred to as Innovation Driven Enterprises (IDEs).

IDEs are a distinct type of firm founded on the basis of potential high impact innovations with global market implications. Successful IDEs can realise rapid growth over a short period of time and as such, can make outsized contributions to output, productivity and generation of quality jobs.

This Research Bulletin will provide an outline of the concept of an IDE, as well as attempting to situate it in a Northern Ireland specific context.

## What is an IDE?

The majority of enterprises are small or medium sized firms (SMEs). In 2022, almost 90% of Northern Ireland businesses had an annual turnover of less than £1m and the vast majority (97.9%) of firms had less than 50 employees.[i]

The ownership structure of many SMEs will typically be simple, often family owned and reliant on minimal external financing at their foundation[ii]. Most SMEs will tend to focus on servicing exclusively local or regional markets, an emphasis that will usually necessitate close proximity between the firms and their clients to minimize transaction costs. As such, job roles generated by these SMEs will often need to be performed locally, making the firm primarily dependent on local labour markets to satisfy need.

For most SMEs, innovation is not integral to their establishment, nor is it the principal source of competitive advantage. Many new SMEs will enter long established industries with limited variation in terms of the goods or services offered by different, competing firms.

This is not to suggest that small, locally focused firms do not engage in innovative activity; over the period of 2018 to 2020 an estimated 38% of SME firms in Northern Ireland were 'innovation active'.[iii] However, for many SMEs, such activity is incidental to their typical business operations as opposed to central to their business strategy and future growth potential.

Consider the example of a sole trader hairdressing business. The business will likely have multiple small competitors within its locality, each offering broadly the same service. This particular service requires close proximity between providers and clients meaning that it will generally need to be performed locally. Most of the jobs that the business may support will be non-tradable, meaning that they are not subject to international competition and cannot be relocated or offshored while continuing to serve the firm's current markets. The business eventually implements an online booking service which allows for more efficient processing of clients, granting a financial advantage to the firm but is not the primary source of its competitive advantage. Clients are more likely to be attracted to the business due to loyalty, convenience or the cost to quality of its service offer.

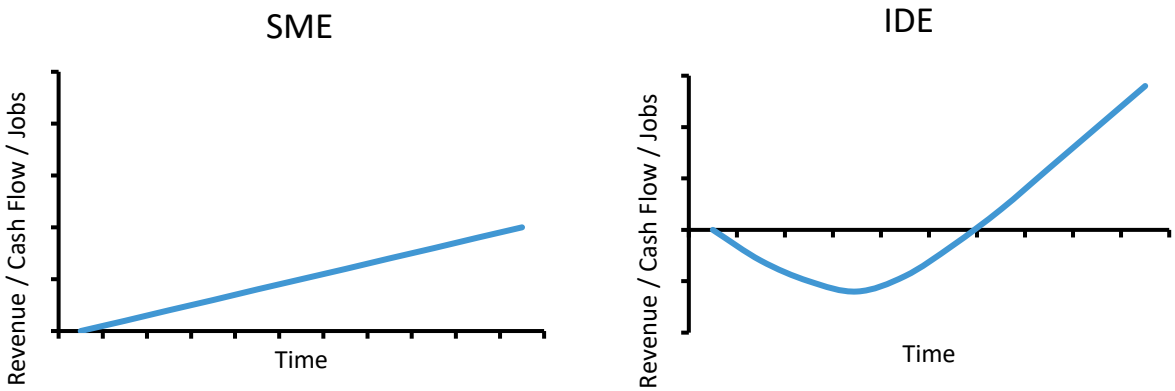
The characteristics of Innovation Driven Entrepreneurship stand in direct contrast to the features of the more common forms of SME entrepreneurship described above:

- The market focus of IDEs will usually be global in nature;
- IDEs tend to be founded on the basis of high potential, high impact innovation with this representing the principal source of the firm's competitive advantage. This innovation may be a new technology, but can also include novel business models or processes with the potential to substantially disrupt one or multiple markets.[iv]
- In view of their global market focus, most IDEs will generate 'tradable employment' i.e. jobs that do not need to be performed locally and that are subject to international competition;[v]
- The ownership structure of IDEs will tend to be atypical. IDEs may have multiple founders with highly specialized skillsets and both foreign and domestic providers of external capital may hold significant equity stakes in the firm.
- The growth trajectory of IDEs also differs from more traditional small-medium enterprises. For small firms operating in mature industries and in primarily local markets, rates of growth will typically be linear. An increased investment of resources in the firm will usually feedback in short order in the form of higher revenues, cash flow and additional jobs.

IDEs will generally require significant investment over a long initial period. This initial investment may be necessary to support intensive research and development activity or to establish a highly novel business model in mature industries. Growth will not respond immediately to this investment and an IDE may have a

long period of income latency where revenues remain small in comparison to investment. However, if the IDE is able to establish itself and become successful it can eventually realise exponential growth, making sizable contributions to output and employment.

**Figure 1: SME and IDE Entrepreneurship; Growth Trajectories**




***S**ource: A Tale of Two Entrepreneurs; Understanding the Differences in Types of Entrepreneurship in the Economy; Aulet B. & Murray F. (2013); Martin Trust Centre for MIT Entrepreneurship*

Examples of successful IDEs from the last thirty years include firms such as Amazon, Netflix or Uber. Each of these firms was founded on the basis of disruptive, proprietary innovations. In the case of Netflix, this innovation consisted of a novel business model combining emergent technology (DVDs), mail distribution and home video rental services, before transitioning to streaming services with the advent of significant technological improvements in data speeds and reductions in bandwidth costs in the mid-2000s.[vi]

Each of these firms required significant starting capital either provided by the founders themselves or through external investors. Amazon in particular required significant initial capital which was mirrored by slow initial growth. These firms eventually realised rapid growth, expanding into global markets (with Uber operating in around 72 countries[vii]) and generating substantial revenues and employment.

## Why are IDEs important to the Northern Ireland Economy?

Recalling the examples provided above, the broader impact of innovative activity will likely differ between the different types of firms described. Innovation activity by small firms that is a product of and supports long established, common business operations would be expected to improve a firm's individual performance. However, the disruptive impact of this type of activity will generally be limited and likely won't contribute positively to aggregate economic outcomes unless it is pursued *en masse* by many different actors.

Successful IDEs tend to be highly disruptive to established markets, often giving rise to significant improvements in consumer welfare in the form of emergent goods and services or more efficient / convenient methods of provision. In some cases, this type of innovative activity can contribute to the obsolescence of

products, services or provision methods that came before. The type of innovative activity pursued by IDEs therefore has the potential to make outsized, positive contributions to long-term living standards by acting as a driver of the forces of creative destruction.[viii]

IDEs that manage to realise rapid growth can make substantial individual contributions to other objectives of relevance to the 10X Vision. In 2021 a small number of large firms accounted for an estimated £319mn (36.2%) of business expenditure on R&D.[ix] A foundational emphasis on innovation will mean that IDEs have a heightened propensity towards the acquisition and generation of new knowledge, including through R&D activities. High growth phase IDEs will have considerable resources to invest in research and development and would be expected to make significant contributions to total such activity in NI.

Previous research has suggested that a small sub-class of firms are responsible for outsized contributions to total job creation. Around 6% of start-ups that survive for 15 years account for over 40% of all jobs creation among this group of firms.[x] In light of their growth trajectory (which would be expected to fuel rapid and high demand for labour) there is likely significant cross-over between IDEs and the population of prolific job-creating start-up firms.

The type of jobs created by IDEs will also tend to differ compared to the profile of employee jobs as a whole. IDEs generate tradable employment - jobs that do not need to be performed locally and as a consequence are subject to international competition. While tradable jobs are not inherently more skills intensive than non-tradable roles, greater exposure to international competition would be expected to upwardly affect the productivity of such job roles.

This is supported by international evidence which suggests that tradable jobs benefit from a wage premium over non-tradable roles, even when controlling for other influences such as firm and employee characteristics. Estimated wage premia vary depending on country of study, but range from 3% to 7%.[xi]

The development of innovation driven entrepreneurship in Northern Ireland will contribute to creating an economy that is more productive, knowledge intensive and exposed to the effect of international competition. The remainder of this Research Bulletin will explore the scope for the development of IDEs through a number of indicators that are designed to approximate their primary characteristics.

## Scope for the Development of Innovation Driven Entrepreneurship in Northern Ireland

### Tradable Employment and Market Emphasis

IDEs tend to be global in their market focus and generate tradable employment. These two characteristics are closely interlinked. The type of output generated by tradable jobs does not need to be produced close to a firm's clients or customer base. Firms with predominantly tradable employment will be able to choose

where to locate and relocate production according to where they can derive the greatest, relative value.[xii] Tradable jobs are therefore subject to international competition and employing firms will tend to sell significant proportions of output to international or external markets.

Different industries will have different exposures to international competition and different ratios of tradable to non-tradable employment. Entrepreneurial activity in industries with large amounts of tradable employment might be expected to skew towards innovation driven activities to a greater degree than other sectors. As such, understanding which parts of the economy are comparatively more exposed to international competition is relevant to assessing which industries may represent the most fertile ground for the incubation of IDEs in Northern Ireland.

The findings of international academic studies that explore the tradability of different industries support the conclusion that jobs in predominantly goods producing sectors tend to be tradable.[xiii] There is comparatively limited evidence concerning the tradability of services.

According to the most recent Northern Ireland Composite Economic Index report, private sector services account for over half (52%) of all NI economic output and around two thirds of total private sector output. The prominence of the services sector highlights its status as a probable source of comparative advantage meaning that Northern Ireland IDEs are, on balance, likely to skew towards this type of activity. The following analysis will therefore focus on predominantly service-based industries.

The aggregate tradability of jobs in different industries can be approximated by analysing spatial patterns of employment. Non-tradable jobs need to be based close to a firm's client base in order for services and products to be economical. Generally, non-tradable industries will tend to be composed of small firms servicing a large number of local markets. The spatial pattern of employment in such industries will therefore tend to be similar to the distribution of the population as a whole.

By contrast, for industries with predominantly tradable jobs, the spatial pattern of employment is likely to be relatively concentrated. Tradable outputs do not require close proximity between firms and clients, meaning that firms can choose where to locate production. In light of their exposure to international competition, firms with tradable employment will likely face incentives to cluster in order to minimise costs through economies of agglomeration.[xiv]

The spatial concentration of employment can be measured through the calculation of locational GINI coefficients. Locational GINI coefficients measure how similar the location patterns of employment in a given industry are relative to the location patterns for total employment.[xv] This requires data on employment by industry and sub-region as well as total employment shares (for all industries) for each sub-region.

$$GINI(Loc)_j = \sum_i (xi - sji)^2$$

In the formula above, xi denotes sub-region i's share of total NI employee jobs. Sji is sub-region i's share of Northern Ireland employee jobs in industry j. The locational GINI coefficient for industry j is therefore the sum of all sub-regions share of NI employment minus their share of employment in industry j. A coefficient value of 0 implies that the locational patterns of employment in industry j are exactly the same as the locational patterns of total employment. A coefficient value greater than 0 implies over-concentration of employment. It is necessary to establish a threshold value over which over-concentration of employment implies tradability. In line with previous academic studies this value is set at 0.1, with some allowance for borderline cases.

The input data for this analysis is employee job estimates from the 2021 Business Register and Employment Survey (BRES). Estimates are split by SIC2 industry and NI Local Government District. Table 1 below shows the results of the analysis for a selection of Northern Ireland service-based sectors.

**Table 1: Spatial Concentration of Employment; Northern Ireland Service Sectors (SIC2)**

| **Tradable** Industry | GINI(L) Coeff. Value | **Non-tradable** Industry | GINI(L) Coeff. Value |
|---|---|---|---|
| Programming and broadcasting activities | 0.42 | Social work activities without accommodation | 0.00 |
| Financial service activities, except insurance and pension funding | 0.23 | Education | 0.00 |
| Computer programming, consultancy and related activities | 0.17 | Food and beverage service activities | 0.00 |
| Advertising and market research | 0.16 | Gambling and betting activities | 0.00 |
| Legal and accounting activities | 0.14 | Other personal service activities | 0.01 |
| Scientific research and development | 0.14 | Sports activities, amusement and recreation activities | 0.01 |
| Telecommunications | 0.12 | Retail trade, except of vehicles and motorcycles | 0.01 |
| Publishing activities | 0.11 | Human health activities | 0.01 |
| Insurance and pension funding | 0.09 | Veterinary activities | 0.01 |
| Postal and courier activities | 0.09 | Wholesale and retail trade and repair of vehicles and motorcycles | 0.01 |
| Electricity, gas, steam and air conditioning supply | 0.08 | Accommodation | 0.02 |

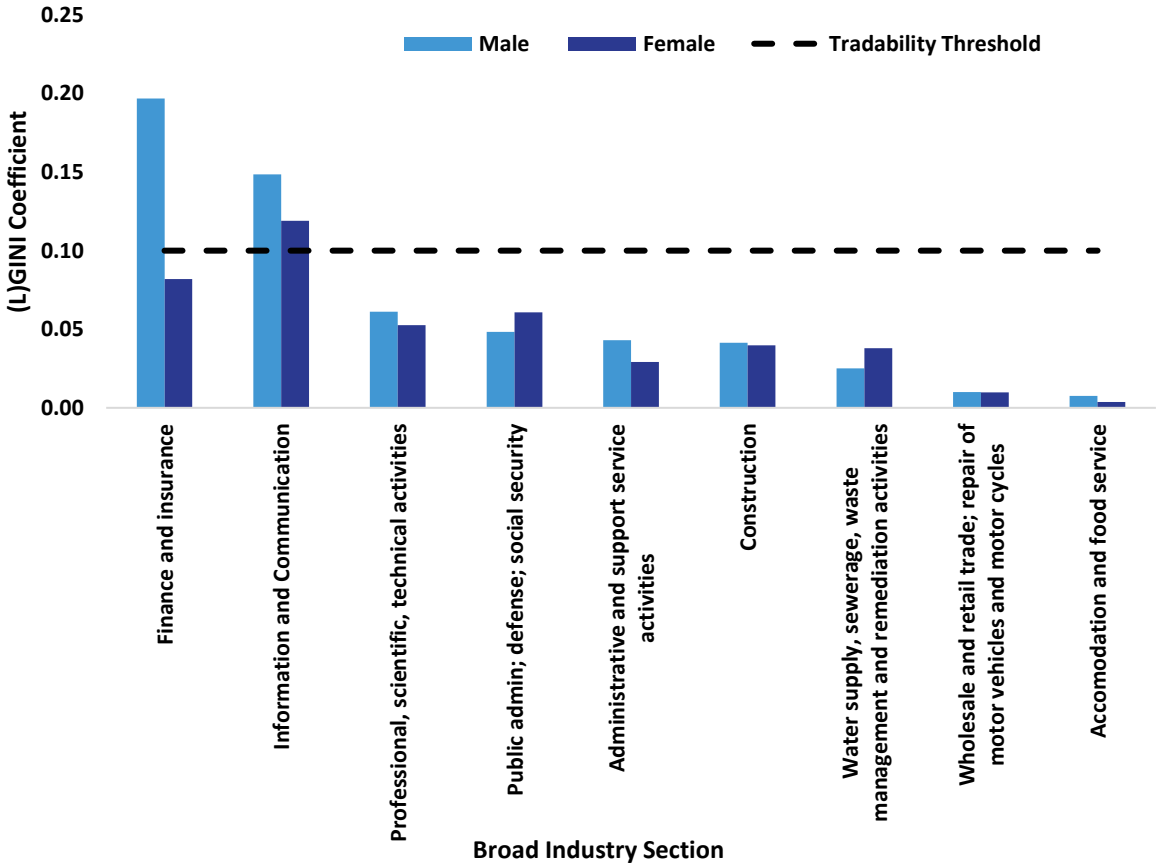
The relative spatial concentration of employment in ICT sub-sectors, advertising and marketing and scientific research and development suggests that technology focused industries are significant contributors to tradable service-based employment in NI. These sectors are also likely to represent the parts of the NI service economy that are the most external in their market focus. In view of this, entrepreneurial activity within these industries might be expected to skew more towards the innovation driven variety in comparison to sectors where the spatial pattern of employment is suggestive of a broadly local market orientation.

This is further supported by analysis of rates of external and international firm ownership by sectors. According to the latest edition of the Inter-Departmental Business Register (IDBR), the sectors with the highest rates of international firm ownership in Northern Ireland were Information and Communication (3.9%), Finance and Insurance (3.9%) and Production (3.0%). Rates of external ownership in these industries may be upwardly affected by the presence of large, established multinationals which may not meet the characteristic definition of IDEs. Nevertheless, higher rates of international firm ownership in a sector would tend to imply greater integration with the global economy, a characteristic that would be expected to facilitate innovation focused entrepreneurship within these industries.

### Distributional Impacts of Increased Innovation Driven Entrepreneurship

Externally focused, technology intensive service industries will represent a key area of interest for policy designed to identify, foster and develop innovation driven entrepreneurship in Northern Ireland. However, it is worth considering whether the benefits of increased rates of innovation driven entrepreneurship (e.g. in the form of higher productivity, better paid employment) are likely to be equitably distributed. Figure 2 below plots the locational GINI coefficient values for a selection of broad industry groupings for both male and female employee jobs.

**Figure 2: Spatial Concentration of Employee Jobs by Industry Section and Gender**




Source: DfE Analysis of Business Register and Employment Survey (2021) data; Employee Jobs by Sub-Region

From the selection of broad industries presented above, the spatial pattern of employment for males tends to be more concentrated than that for females. For most industries, the difference between male and female coefficient values is minor. The coefficient values for predominantly public activities such as education and healthcare are also close to zero for both groups. The Finance & Insurance and ICT sectors are notable outliers.

Although women account for a majority of employee jobs in the Finance and Insurance sector (54.9% as of 2021),[xvi] the significant gender difference in spatial concentration of employment suggests that women have a greater propensity to select into non-tradable, lower value-added occupations within the sector. The ICT sector has a lower gender disparity suggesting that women are only slightly less likely than men to select into tradable employment within the sector. This is counterbalanced by the fact that female employee jobs account for only 31.7% of the sectoral total, suggesting that women are less likely to select into the sector in the first instance.

The observed differences in male and female locational patterns of employment highlight two important considerations. Not all jobs within a particular industry will be tradable or non-tradable and different groups may select into one or the other with greater relative frequency. The latter point is important in the context of the 10X Vision's emphasis on inclusivity.

Financial services and technology focused industries likely represent the most fertile ground for innovation driven entrepreneurship in Northern Ireland, but the benefits of such activity will be unequally distributed if current patterns of selection into and within these sectors persist. There is a risk that a policy focus on these areas of the economy, while conducive to fostering innovation led growth, could aggravate adverse trends in relation to inclusivity unless matched by concerted effort to broaden their appeal to under-represented groups.

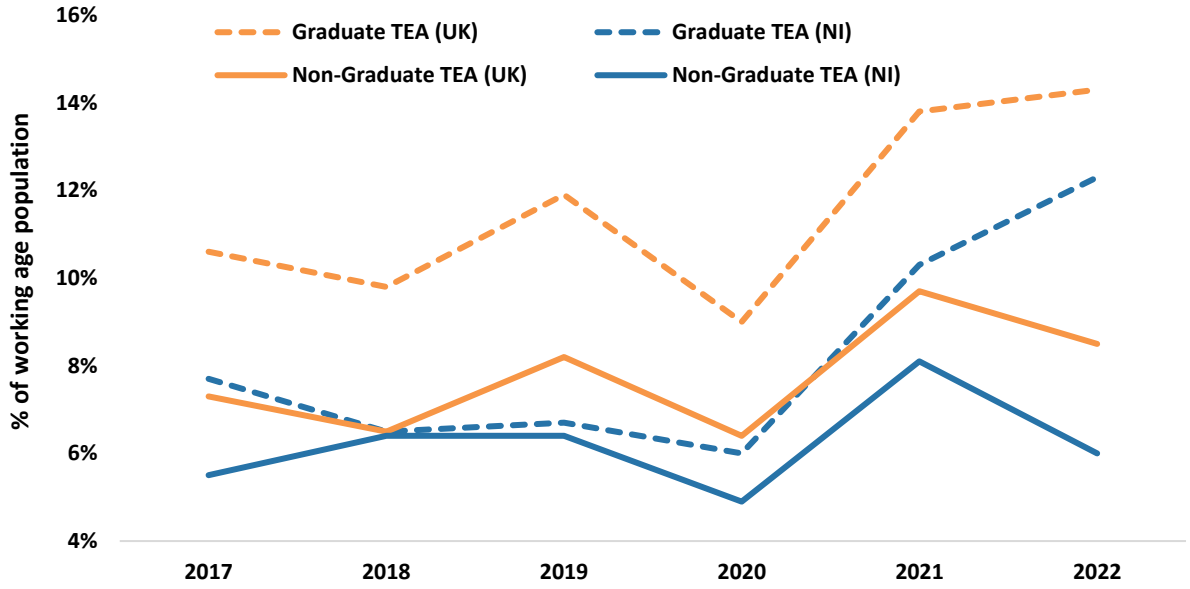
### Entrepreneurial Characteristics

Another characteristic of IDEs that distinguishes them from more common forms of SME entrepreneurship is their ownership structures. IDEs can often have multiple founders with advanced and diverse skills. The supply of skills within an economy is an important contributor to the wider innovation ecosystem through its effect on the absorptive capacity (the ability to understand and apply external knowledge or technology) of economic actors. Analysis by the Ulster University Economic Policy Centre suggests that the employed population in Northern is relatively well qualified, with 37% of employees holding NQF6 [1] or higher qualifications[xvii]. This is the highest proportion of any UK region outside London.

[1] National Qualification Framework (NQF) Level 6 qualifications include bachelors degrees and higher vocational qualifications.

With respect to IDEs specifically, both the supply of skills and the relative propensity of skilled individuals to engage in entrepreneurial activity are important indicators of how conducive business conditions are for innovation driven entrepreneurship. The Global Entrepreneurship Monitor (GEM) measures rates of early-stage entrepreneurial activity[xviii] within national and regional working age populations, including by both graduates and non-graduates.

**Figure 3: Total Early Stage Entrepreneurship Rates (Graduates and non-Graduates); UK and NI**




Source: Global Entrepreneurship Monitor, Northern Ireland Report

Prior to 2021, rates of early-stage entrepreneurship amongst NI graduates were relatively stable. Between 2020 and 2021 the increase in early-stage graduate entrepreneurship in Northern Ireland was broadly in proportion with UK wide trends. The proportionality and rapidity of growth during this period suggests that rates may have been affected by structural shifts in the labour market as a result of the COVID-19 pandemic. From 2021 to 2022 growth in early-stage entrepreneurship in Northern Ireland outpaced that in the UK as a whole and unlike Scotland and Wales, the difference between graduate and non-graduate TEA rates in 2022 is statistically significant.

The strong skills endowment amongst the employed population ensures that there is deep pool of potential entrepreneurs with the ability to pursue knowledge intensive activities, as well as a sufficient supply of skilled employees to support such endeavors. At the same time, recent trends in early-stage entrepreneurial activity amongst graduates are suggestive of a skilled population that is increasingly well-disposed towards entrepreneurial activity. Both of these factors support a broadly positive outlook for future innovation driven entrepreneurship in Northern Ireland.

Despite this, a number of issues persist. While the proportion of employed individuals with NQF 6+ skills is relatively high, Northern Ireland has a high proportion of working age people with no or limited skills relative to other UK regions[xix]. This may suggest that the strong skills endowment in the employed population is at least partially a function of lower skilled individuals being disproportionately less likely to select into paid employment in Northern Ireland than elsewhere. This dynamic may constrain the effective supply of skilled labour meaning that workforce skills are less than optimally utilized. Maximising the effective supply of skilled labour that can support innovative activities may require further effort to increase labour force participation and further reduce the incidence of limited qualification attainment.

Although graduate entrepreneurship is comparatively more likely to skew towards innovation focused activity, available evidence suggests that the majority of enterprises in this category remain oriented towards more traditional forms of SME entrepreneurship with predominantly local / regional market emphases. Although Northern Ireland businesses are more likely to collaborate on innovation (relative to EU peers)[xx] the majority of this activity is undertaken in a local rather than a national or international context[xxi]. Further, in 2022 only 0.7% of early-stage entrepreneurs and 0.1% of established businesses in Northern Ireland believed there was at least an international market scope for their products, processes or services.[xxii] Accelerating the development of IDEs in Northern Ireland will likely require a greater degree of commercial interaction between domestic enterprises and international markets, competitors, suppliers and partners than has been seen to date.

IDE entrepreneurship would be expected to be significantly more uncommon in comparison to more traditional, locally focused forms of SME entrepreneurship. The small proportion of entrepreneurs that envisage at least an international scope for their products / services offers a point of reference for this relative rarity, supporting the view of IDEs as a highly distinct sub-class of firm with unique needs and constraints that will likely demand a dedicated policy response.

By way of an example, IDEs can undergo a long period of income latency where investment significantly outpaces revenues. This can make it prohibitively difficult for IDEs to obtain support through traditional methods such as debt financing. This will likely incentivise founders to seek support through more specialised products such as equity financing.

According to the British Business Bank, in 2021 there were a total of 39 announced equity financing deals for Northern Ireland firms, with a total value of £88m. These figures represent a 44% increase in deals and 240% increase in the total value of announced equity financing compared to 2020 figures. Although London accounts for almost two-thirds of equity financing by value in the UK, Northern Ireland is unique among the devolved regions in having seen an increase in equity financing deals from 2020 to 2021.

Recent trends in equity financing deals in Northern Ireland present a broadly positive backdrop in terms of the availability of initial support for innovation driven entrepreneurship. The large year-on-year increase in the value of deals suggests that the broader ecosystem of non-traditional financing products (on which IDEs are likely to disproportionately rely) is broadly responsive to realised demand. Despite this, Northern Ireland ranks below most UK regions on relative measures of the value of equity financing. In 2021, the value of equity financing per 1,000 people was £46,205, making Northern Ireland the ninth ranked UK region overall.

It is not clear whether small proportional equity financing flows are a result of weaker demand for such products, or whether the supporting ecosystem in Northern Ireland requires maturation to more effectively match prospective firms with potential investors. Regardless, the development of non-traditional modes of financing will likely be a key factor in formulating a bespoke policy response in relation to innovation driven entrepreneurship.

## Formulating a Policy Response and Ongoing Challenges

As highlighted above, IDEs represent a highly distinct and uncommon type of firm with bespoke needs and challenges that demand a tailored policy response to support.[xxiii] A key factor in devising such a policy response is the identification of such firms with a view towards developing a baseline against which the effectiveness of dedicated interventions can be assessed. The number of IDEs is a proposed Tier 2 Metric under the Innovation Led Growth pillar of the 10X Metrics Baseline Report[xxiv] and direct support for IDEs is listed under actions 3.1 and 3.2 of the 10X Delivery Plan[xxv]

There are a number of evident challenges concerning the identification and quantification of IDEs. Some distinguishing characteristics of IDEs are incongruous with the way that data is collected for the purposes of producing official statistics. Data collected for the purposes of national accounts or labour market statistics does not distinguish employee jobs on the basis of tradability for example. Insight from analytical method will tend to be limited by the possible degree of sectoral or occupational aggregation or the validity of the assumptions employed.

Two key distinguishing characteristics may assist with the identification of IDEs in Northern Ireland. The type of innovation pursued by IDEs is distinct (in terms of potential impact and market focus) from that undertaken by most firms. The key source of information for firm innovation activity in Northern Ireland is the UK Innovation Survey (UKIS). The UKIS identifies innovation active and broader innovator firms using a common definition produced by the OECD.

Although the information collected by the UKIS is capable of distinguishing innovation activity by broad type (product, process etc.) arguably the more relevant characteristic for approximating IDE status is the potential impact of the innovation. Innovation activity by IDEs tends to be disruptive to established industries. Assessing

the potential impact of an innovation with a view towards identifying IDEs may require more detailed surveying of the nature of respondent innovations relative to current practice in relevant industries and the identified potential market scope of their subsequent output.

The second characteristic is firm growth. Successful IDEs can realise rapid growth in revenues and employment. Both of these outturns are directly measurable by official data sources, providing a basis for developing a baseline. DfE produces statistics and analysis on high growth firms using IDBR data.[xxvi] The definition of high growth firms is the same as the OECD measure of high growth. The OECD definition classifies any firm (with 10 or more employees) that has experienced 20% annualised growth in employment or turnover over three years relative to a base period as high growth.

This definition has been criticised as inapposite for the identification of a small sub-class of prolific growth firms. Previous research[xxvii] (examining the total UK business population) has used an alternate method which analyses contribution to jobs growth amongst 15 year survivor start-ups. This research has found that a small proportion (6%; around 1,200 UK firms) of 15 year survivor start-ups account for around 40% of all job creation. This small sub-population is likely to approximate historic IDEs to a greater degree than the population of high growth firms using the OECD definition. A similar Northern Ireland focused analysis may be warranted for the purposes of developing a baseline of firms that display growth behaviours that would be expected of successful IDEs.

In addition to building dedicated statistical baselines, the Department for the Economy has committed to the development of an Entrepreneurship Strategy in collaboration with the Regional Entrepreneurship Accelerator Programme (REAP) group. The Northern Ireland REAP is intended to facilitate the development of an innovation ecosystem conducive to the support of innovation driven entrepreneurship[xxviii]. Understanding the profile of existing IDEs will be essential in diagnosing limiting factors on their success and making decisions on what features of the Northern Ireland innovation ecosystem to prioritise.

## Conclusion

The development of innovation driven entrepreneurship in Northern Ireland will be a key contributor to innovation led growth as articulated by the 10X Vision. The development and support of entrepreneurial activity in technology intensive industries, scientific research and development and financial services will likely be key areas of focus for policy going forward. At the same time, there is a need for parallel action to enhance inclusivity in these parts of the economy so that the benefits of increased rates of innovation driven entrepreneurship are fairly distributed.

Although recent trends in entrepreneurial activity amongst skilled individuals are encouraging, further action is required to encourage commercial interaction, collaboration and knowledge exchange between Northern Ireland businesses and international markets and actors.

Evaluating the effectiveness of policy interventions will require the development of robust baselines against which performance can be measured. This is complicated by the complex and indistinct characteristics of IDEs and their expected rarity, making effective measurement difficult.

Developing IDE baselines may necessitate changes to the way in which business activity is surveyed and measured and substituting relevant conceptual definitions for more appropriate alternatives. Both of these actions will undermine the external comparability of any developed baselines but this may represent an acceptable trade-off in view of the importance of innovation driven entrepreneurship to DfE's strategic priorities.

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[i] Interdepartmental Business Register (2023); NISRA; Detailed Tables 1.3 & 1.4
[ii] Annual Business Inquiry (NISRA); Over two-thirds of total SMEs estimated to be family owned in 2022.
[iii] UK Innovation Survey (2021); Northern Ireland Results; NISRA
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[vi] Netflix; Statistics and Facts; *Statista*
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[xi] The Evolution of Tradable and Non-Tradable Employment; Evidence from France; Frocrain P and Giraud P.N. (2017); Mines Paris Tech Centre for Industrial Economics
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[xvi] Business Register and Employment Survey (2021); Detailed Tables; NISRA
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[xxiv] Measuring Success; 10X Metrics to Achieve a 10X Economy; Baseline Report (2022), Department for the Economy
[xxv] 10X Delivery Plan, Department for the Economy
[xxvi] Northern Ireland's High Growth Firms (2022); Department for the Economy
[xxvii] Moving on from the Vital 6%; Hart M. & Anyadike-Danes M. (2014); Enterprise Research Centre Insights
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