

Demand for Big Data/Data Analytics Skills in Ireland 2013 – 2020

May 2014



- To forecast the annual demand for Big Data / Data Analytics and related skills across the economy over the period 2013-2020.
- To assess the current and emerging qualifications, skillsets and competences requirements.
- To advance recommendations on measures to build up the big data and data analytics talent pool
- The study linked up with the work of the Joint Industry/Government Big Data Taskforce set up to progress APJ 2013 Disruptive Reform.
- EY were engaged to undertake several elements of the research work. Forfás undertook certain elements of the research and managed the project.



The research process comprises the following elements:

- Literature Review of available international and domestic research .
- 45 Structured company/organisation interviews – foreign owned & indigenous .
- 10 Structured Key Stakeholder interviews – including IDA, EI, SFI, Chief Information Officer and 5 overseas companies .
- 3 Workshops with a wide range of companies and organisations.
- Baseline employment demand estimation and Demand Scenario forecasts (including expansion and replacement demand) - based upon both quantitative analysis and informed by qualitative insight
- International review of actions by selected countries to build up data analytical talent.
- An assessment of current and planned data domestic data analytical relevant education and training provision at NFQ Levels .



Outputs of the Report

- ❖ Demand scenarios forecasts over the period 2013-2020 of the demand for Big Data / Data Analytics roles and their skills, competences and qualifications requirements.
- ❖ Mapping of current and anticipated skills needs against existing and planned relevant programme provision.
- ❖ Recommendations on additional measures that could be taken to build up the skills supply of Big Data / Data Analytics talent – quantity, quality and diversity of skills – with a particular focus on “deep analytical skills” roles.



Membership of the Steering Group formed to oversee the development and progress of the Study was:

- Margaret Cox, EGFSN (chairperson)
- Vincent McKey, IBM
- Edel Lynch, Accenture,
- Paul Forde, Glanbia Plc
- Conor Murphy, Data Hug
- Maurice Lynch, Nanthean Technologies
- Kevin Magee, Vidiro Analytics
- Duncan Cleary, Revenue Commissioners
- Aidan Mc Cauley, IDA Ireland
- Gerard Lande, Enterprise Ireland
- Grainne Morrissey, Department of Education & Skills
- Tim Conlon, Higher Education Authority
- Peter Cosgrove, CPL
- Sean Mc Garraghy, Quinn School of Business UCD
- Richard Southern, Deloitte
- Marie Bourke Forfás
- Gerard Walker Forfás



The following is a broad categorisation of Big Data / data analytics roles

➤ **Deep Analytical Talent**

Roles with a combination of (i) advanced statistical, analytical & machine learning skills; (ii) business skills to assess the meaning of data and derive business insights; (iii) analytical & problem solving skills, and (iv) communication skills to explain/ persuade other executives. The shortage of deep analytical talent internationally has been identified as the most acute constraint on potential business growth.

➤ **Big Data “savvy” Talent**

Roles comprising “data savvy” managers, CIO’s, market research analysts, business and functional managers that require a significant understanding of the value and use of analytics to enable them to interpret and utilise the insights from the data and take appropriate decisions to advance their company strategy and performance.

➤ **IT Supporting Technology**

IT Roles for the application and development of data bases, analytics and business solution software i.e Hadoop, MySQL, MapReduce, visualisation software.



- Analytics is not a sector as such and given the newness of the data analytics area, new job titles are just emerging and are as yet not reflected in official data.
- Four international studies of relevance – each used different, but overlapping definitions of skills and competency requirements- Mc Kinsey, Accenture CEBR, SAS.
- Use of top down estimates – applying findings from other countries in the above studies to Ireland in an informed way - incorporating a two year lag.
- Using insights from the 55 consultations with companies organisations and stakeholders and advice from Steering group which included companies involved in data analytics, to inform how estimates could be applied to Ireland.
- Use of bottom up labour market data where appropriate from special tabulation of Census to assist in arriving at the estimation of the baseline employment for deep analytical talent. This includes only those with an education at NFQ level 9 and above.



- Within the deep analytical skills category, there are two distinct roles whose demand are expected to advance in different ways. These are:
 - (1) “established analytical” roles (actuaries, economists) where future demand will be less influenced by the expansion of data in the business environment - and
 - (2) “emerging data driven” analytical roles which are significantly influenced by the expansion of data.
- These two sub – groups are then treated differently in the scenario analysis – with “data driven” analytical roles expected to expand much greater than for “established data” analytical roles over the period 2013 – 2020.



Category	Employment	% Total Employment
Deep analytical talent	3,300	0.18
<i>Of which</i> emerging analytics roles	1,500	0.08
<i>established analytical roles</i>	1,800	0.10
Big data savvy	25,780	1.38
Supporting technology professionals	6,000	0.32
Total	35,080	1.88



The following two demand scenarios are presented

Medium Growth Scenario – Delayed Catch-Up

Under this scenario, following a lag period in the demand for deep analytical roles, Ireland achieves the type of proportions of total employment forecast for other countries such as the UK. It is assumed that the majority of additional deep analytical jobs would be in business already here.

High Growth Scenario – a leading country in Europe

This is the more ambitious scenario – where total employment reaches the levels anticipated in the enterprise surveys – including a significant increase in deep analytical talent employment. Under this scenario there is an assumed step change in existing private firm and public organisations understanding and actual exploitation of data analytics business potential. There is also an assumed level of potential inward investment in big data and analytics activity.

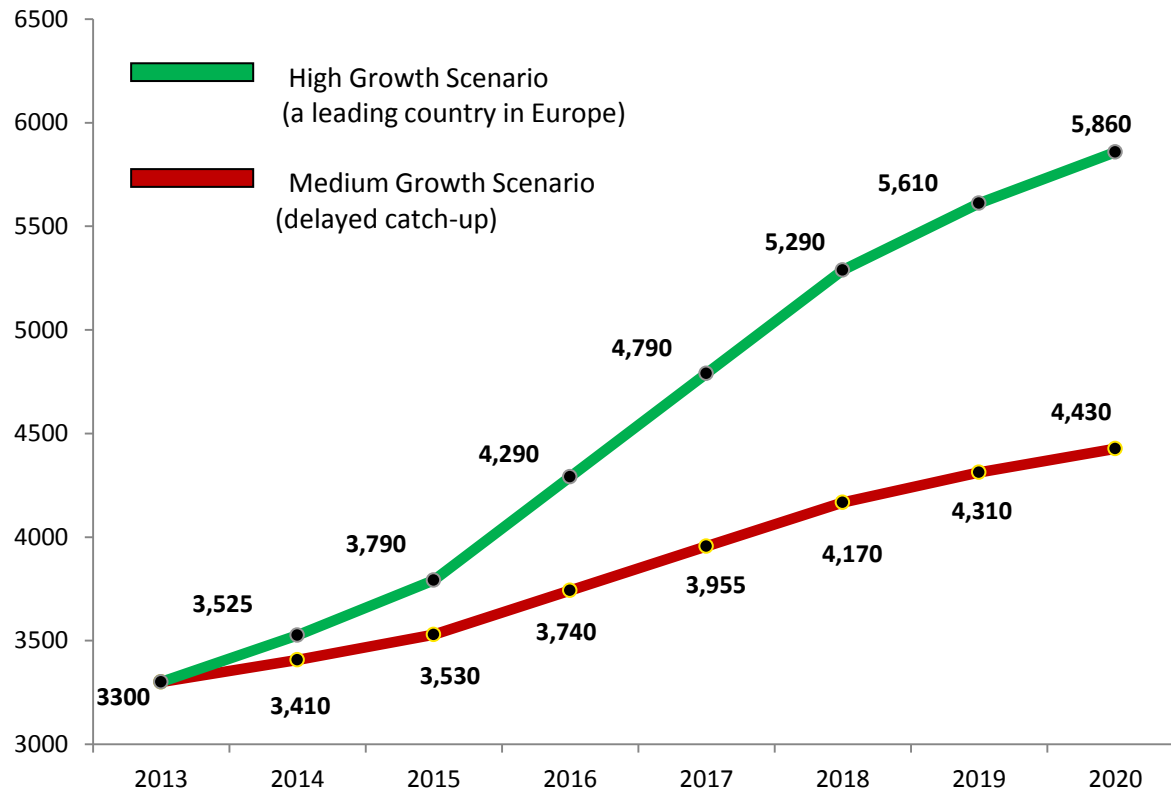
Total Deep Analytical Roles Demand Change 2013-2020



Under the High Growth Scenario the employment of deep analytical talent would grow by 80%

Within this, the demand for “emerging” data analytic roles would grow by 155%

Majority of deep analytical demand growth in both scenarios will be for new additional jobs

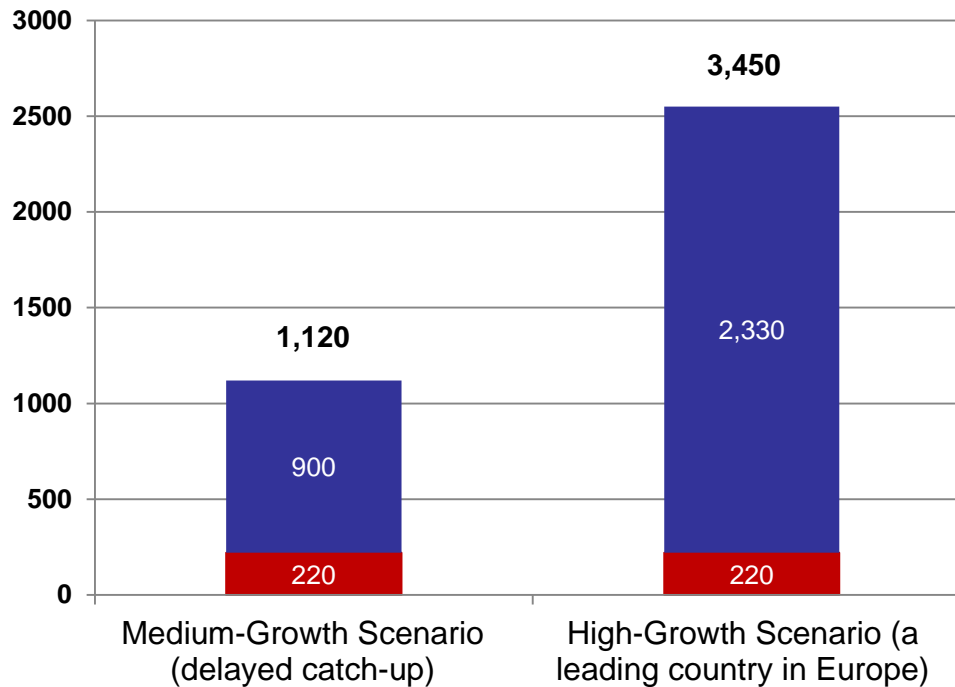


Deep Analytical Roles - Expansion Demand Change 2013-2020



Emerging “data driven” deep analytical skills display more dynamic growth – +150% in scenario 3

“Established deep analytical roles grow in line with the key sectors in which such roles are found +14 % in both scenarios

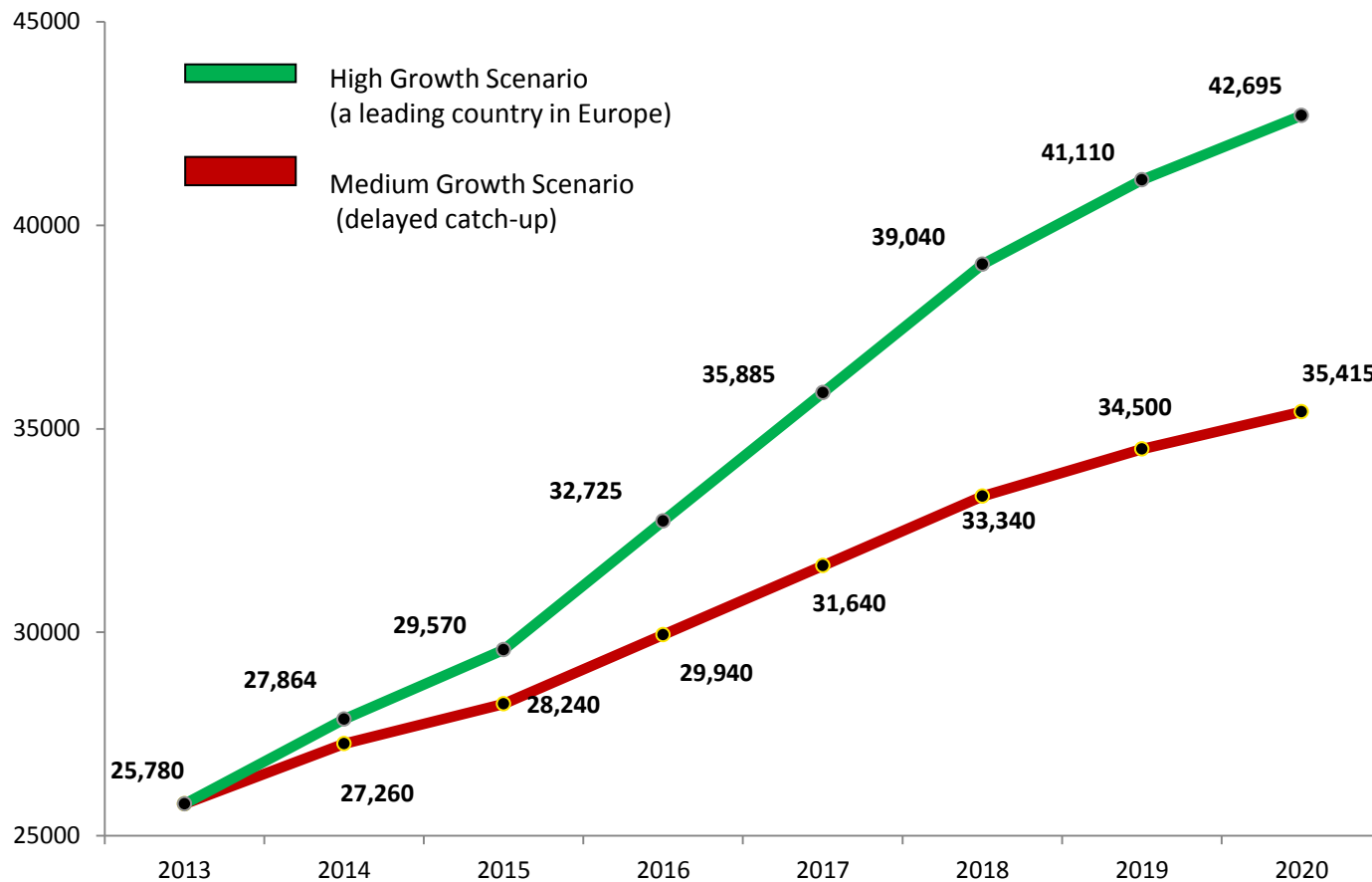


- Emerging data driven analytics roles
- Established analytical roles

Total Big Data “Savvy” Demand Change 2013 – 2020



The upskilling of those in existing roles will be important for the big data savvy cohort

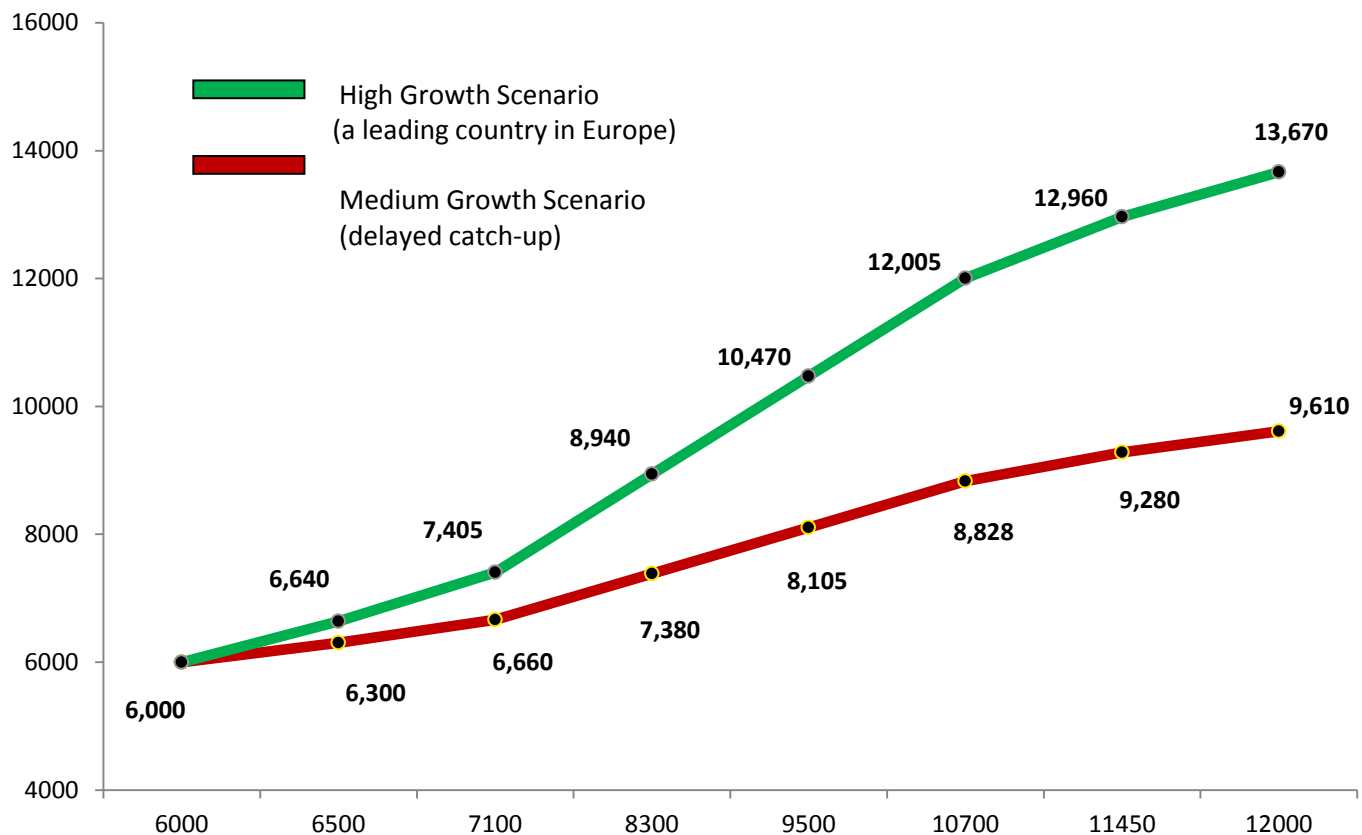


Total Supporting Technology Roles Demand Change 2013 – 2020



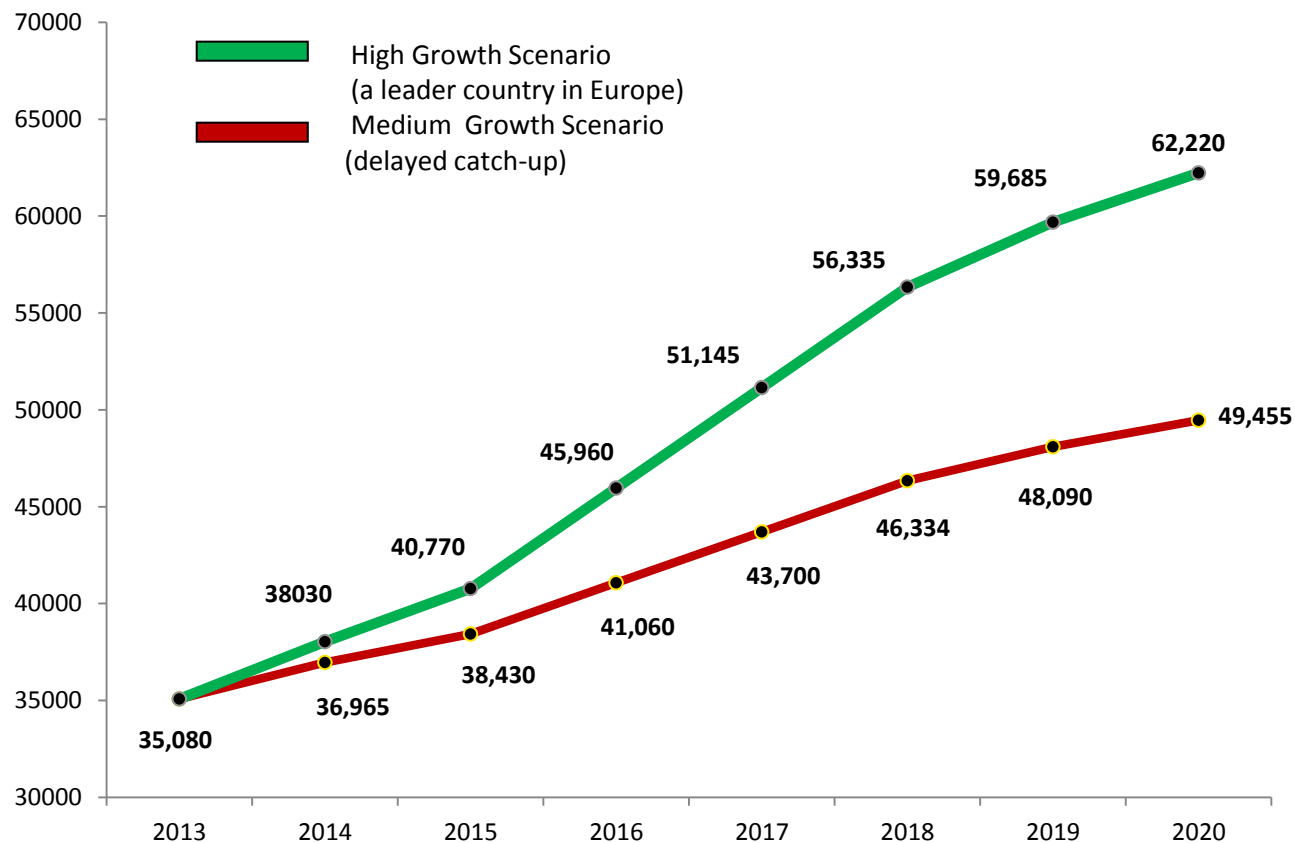
Demand for supporting technology roles grows in line with deep analytical talent

Demand to be met by upskilling and expansion - as forecast in EGFSN High – Level ICT Skills report

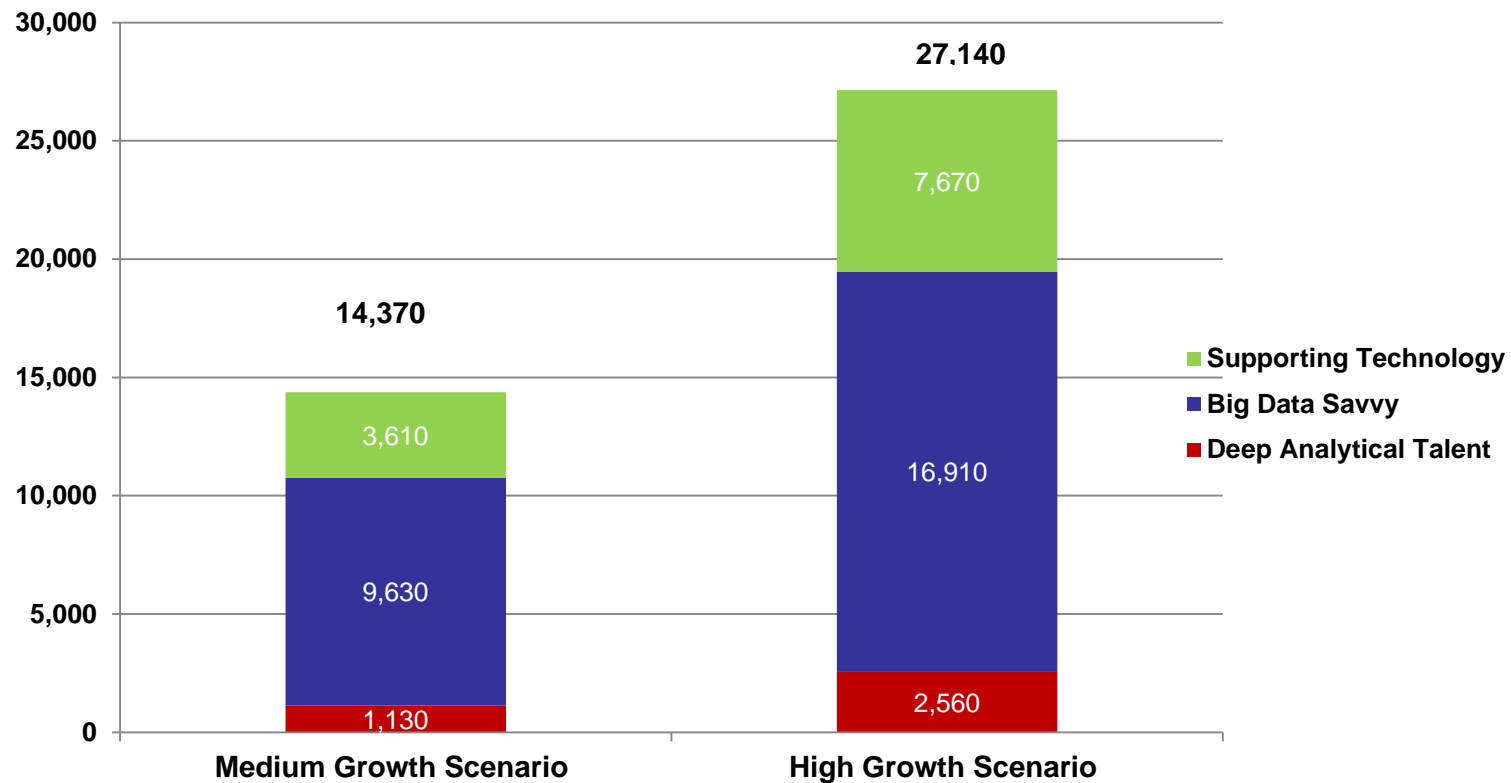


Source: EY, Oxford Economics

Total Big Data / Data analytics Demand 2013 – 2020



Total Big Data and Analytics Demand Change 2013 – 2020



Consultation feedback from companies / organisations (1)



- All respondents expect their future demand for big data / data analytics skills to grow and mix of skills to change. (caution that across the wider economy not all firms and public bodies, especially SMEs see and understand the value of big data or have sufficient scale and technical ability to exploit its potential)
- Two thirds of respondents would apply more resources in this area where the skills available. (Public Sector is the possible outlier)
- Vacancies hardest to fill in order of priority are (1) Deep Analytical talent, (2) Supporting Technology and (3) Big Data Savvy roles.
- A majority see technical skills as being transferable from sector to sector while domain knowledge can be developed through internal training and coaching.
- 85% of respondents expect that suitable talent will be difficult to find in the future due to insufficient skill mix (technical & business)/ insufficient education/ experience factors (due to newness of field).



- Enterprises Source of talent varies between skill categories:
 - For deep analytical skills it is new graduates and hiring experienced graduates from other firms (job churn) and hiring talent from abroad.
 - For Big data savvy roles the main channel is through the retraining of staff.
 - For supporting technology roles it is through hiring new graduates, hiring staff from other firms (churn), the upskilling of existing staff; and hiring from abroad.

- Employers see maths, statistics and computer science disciplines the most important sources of graduate skills for deep analytical roles- especially at post graduate level
Employers have a concern that the quantity of deep analytical output is insufficient.

- For Big data “savvy” roles the main disciplines are business and management.

- For supporting technology roles the disciplines are computer science ; science ;engineering

- In addition to supply from the education system, in-house training and continuous professional development are important sources of skills in this area. This is mostly focused on a core specialist staff engaged in big data analytics.



- The supply of Big Data and Analytics dedicated third level courses within Ireland is still at an early stage, mainly due to the fact that the demand for data analytics talent has only come to the forefront of business precedence in the past three years.
- An assessment has been completed of current and planned course provision for data analytics and related skills in Ireland at NFQ levels 6/7 and 8/9/10 as follows:
 - Dedicated Big Data & Analytics Programmes
 - Programmes that include significant training/elements in data analytics
 - Core degrees - maths, statistics and science.
 - Computer Science Programmes
 - Engineering Programmes
 - Physics Programmes
 - Skillnet Programmes
 - Private Data Analytics Programmes
 - Online Education in Data Analytics



- Strong link between investment by Government and business in Big Data R&D within higher education institutes and the level of provision provided within those institutes.
- Trend towards interdisciplinary approach to big data / data analytics education – involving the reorientation / leveraging of exiting resources and collaboration across departments.
- Programmes are run under a range of different departments – in the USA many are run by Business departments - UK has established a Big Data Academy.
- A key feature of programmes is the close collaboration of business with higher education in the development, design and running of the programmes and supply of tools and software.
- Majority of specialised data analytic programmes are at post graduate level – delivered full-time, part-time, and also through online provision. There are examples of business and computing programmes at undergraduate level which offer data analytic modules.
- Some countries – Singapore – are offering scholarships for talented students to pursue data analytics training programmes and careers after graduation.



- ❖ Enterprise and education providers should collaborate to increase the output and ensure the quality and relevance of “Deep analytical” courses – including curricula, assignments and structured work placements. Facilitate industry expert participation in course delivery.
- ❖ Increase the output and quality of “Data analytics savvy” talent. Introduce and / or update emerging analytics concepts and techniques on the curricula of business and social science courses.
- ❖ Improve senior executives understanding of the potential of data analytics for business performance. Firms should adopt an enterprise-wide approach to managing their data analytics capabilities. Industry should support the establishment of an Analytics Skillnet.
- ❖ Appeal to the broadest potential pool of “Deep analytical” Talent . Introduce targeted competitive funding for post graduate specialist analytics programmes to reduce tuition fees, incentivise participation and increase places available.



- ❖ Promote Ireland Internationally as the Centre for Analytical talent. Establish a single website to attract international talent-including big data and data analytics.
- ❖ Inspire the next generation of Analytic Talent. Communicate the availability of career opportunities in analytics to students (particularly females) and their parents and teachers.
- ❖ Measure the progress in Big data and Analytics employment. Industry and State Agencies should work with the CSO and Revenue Commissioners to explore the further development of official measures of big data and analytics employment.
- ❖ Unlock the potential of Big data and analytics in the Public Service. Government bodies should undertake a review of data sources held and make open as much data as feasible. Consider tailored recruitment to analytics jobs in the public service and the development of a Government analytics service.