HEIF – Skills for Solent Project Report
Future Predominant Sectors, Hotspots and Evolving Jobs

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1. Aim and Nature of the Research

Hampshire Chamber of Commerce, with Southampton Solent University and Business South, has undertaken important research into the future skills needs of employers in the Solent area. The 'Fourth Industrial Revolution' will drive development in the digital age by fusing technologies and continuing to blur the lines between the physical, digital and virtual, and biological spheres. A new age is emerging, where new technologies, such as drones, virtual and augmented reality, genetic breakthroughs and self-driving cars – will dramatically change skills needs globally, nationally and in the Solent area.

This research includes a literature survey of global, UK and Solent trends and identifies future predominant sectors, geographical hotspots and evolving jobs over the period to 2025. This is supplemented by research into evolving job roles and future skills needs. Potential disruptors to employment, skills and competencies are then identified. This all enables identification of challenges for employers, schools, colleges and higher education institutions.

Focus groups and an on-line questionnaire of local employers gained important views on how jobs will evolve and the skills, competencies and behaviours that will be needed in the workplace towards 2025. It was also found that employers will need to change behaviours in the period in order to get the best from employees.

Respondents covered the range from micro enterprises (1-9), through small (10-49), medium (50-249), to large firms (250+), with more representation at either end of that scale. The questions put to business are in the Annex to this paper and were qualitative in nature.

2. Summary of What Local Businesses Should be Aware Of

2.1 Sectors that will Develop in the Solent Area (above average growth)

- Marine and maritime.
- Advanced manufacturing, including aerospace and defence.
- Business, finance and professional services.
- Construction and regeneration.
- Creative industries, especially the digital applications.
- Education.
- Healthcare.
- ICT industries and applications in all sectors, including virtual and augmented reality.
- Low carbon economy, e.g. marine, energy and housing.
- Transport and logistics.
- Visitor economy.

These mirror most developing sectors globally and nationally, but with less emphasis locally on finance (HQs), life sciences and biotechnology, pharmaceuticals, agricultural technologies and automobile assembly.

2.2 Advice and Support to Make Use Of

- Support for growth and investment:

  - Solent Local Enterprise Partnership (LEP)
  - Hampshire Chamber of Commerce
  - Solent Growth Hub:

    - Information
    - Loans
    - Grants
    - Advice and Support

- Growth sectors and improving productivity:

  - Solent LEP Strategy
  - Solent Skills Strategy

- Future South:

  - Achieving a low carbon economy in the region.
  - Support for SMEs.

2.3 Evolving Jobs in the Solent

Job opportunities will grow and develop in areas including:

- Sales and retail.
- Advanced manufacturing and engineering.
- Business and finance, including Fintech.
- Construction, especially green and modular.
- Defence and aerospace.
- Education.
- Green energy/renewables (’cleantech’).
- Health and social care.
- Hospitality.
- ICT, including augmented and virtual reality, cyber-security.
- Marine and maritime.
- Project management.
- Transport and logistics.

Employers should talk to your local university or college about these needs.

2.4 Skills Needed in the Solent Area

Productivity is currently below UK and South East averages:

- Work with your local university and colleges to upskill your teams and recruit skilled people.
- This includes apprenticeships at all levels, up to higher and degree level.
- Take advantage of the apprenticeship levy to train and retrain your staff.
- Send your people into education to speak with students. This provides training both ways.

Future skills needs:

- Soft skills will be highly valued (technology can replace hard skills).
- Collaborative specialist teams working with schools, colleges and universities.
- STEM skills (science, technology, engineering, mathematics).
- Leadership and management.
- Entrepreneurship.
- Skills to boost overseas trade.
- ICT skills, including data analysis and analytics.
- Coaching/people development/talent management.
- Communication, including through social media.
- Sales and marketing.

The report compares these skills with those needed in the wider UK and globally.

2.5 Keeping the best staff talent with Higher Skills

In the global 'war for talent', wise employers should be aware of the following:

- Personal values are important to Generation Y.
- Social and environmental values are prized.
- Ethics and corporate social responsibility will be the norm.
- Generation Y is more globally minded.
- Flexible working patterns are valued, as is time to travel, retirement is a long way off!
- Financial rewards are not everything.
- Talent is mobile.
- There will be more freelancers/consultants.
- More people will run their own businesses.

2.6 Global Economies that Local Businesses think will be Important (Focus Group Research)

- USA
- Russia
- India
- Eastern Europe
- Turkey
- Asia – South Korea, Philippines, Indonesia, Vietnam
- South America – Mexico, Brazil, Peru, Columbia

Desk research adds other countries, notably China, and pinpoints cities expected to be future hotspots.

2.7 Local Businesses Suggest that UK Hotspots will be in:

- South of England
- Northern cities, such as Manchester, Newcastle, Edinburgh

Desk analysis pinpoints, among others, Cambridge, Bristol, Glasgow and Nottingham.

2.8 Challenges for Employers, Schools, Colleges and Universities

The previous factors require business and education to work together more closely to develop:

- Relevant soft skills
- A better interaction to equip people for the workplace.
- A better dialogue on which skills and qualifications are needed by business.
- Gender balance in all areas, especially STEM skills.
- Education and training in shortage skills, once identified.
- Rounded, multi-skilled people.
- The required level of technical and digital skills in new and existing staff.
- Customer service skills appropriate for the 24/7, social media age.
- Communication, people management and transferable skills across national and cultural boundaries.
- New skills and competencies in people as the environment changes.
- Sharper digital marketing skills.
- A seismic shift in how skills and competencies are taught (’real-world’ learning).
- Collaboration of business and education.
- More business people to speak to students.

3. Future Predominant Sectors, Geographical Hotspots and Evolving Jobs

3.1 Global Trends

3.1.1 Future Sectors

Some of the industry sectors most frequently predicted to become predominant in the future are; energy, technology, healthcare, construction, education, aerospace and defence and finance (HIS Markit, 2016; National Research Council, 2013; PwC, 2014; Sykes, 2014; UKCES, 2014b; Van der Elst, 2015). Reasons for these predictions involve the increased focus on renewable energy (National Research Council, 2013), advances in fossil-fuel extraction technology and new oil-field discoveries, which are predicted to lead to some of the world’s largest energy projects (Sykes, 2014).

The increasing use of technology and new technological breakthroughs will continue to influence the future, and the digitalisation of production and manufacturing processes will drive a new era of industrialisation (PwC, 2014; UKCES, 2014b). We are currently experiencing increasing research in big data, biological and molecular engineering and ICT, which will in return create new technologies, industries and thus new jobs. We will also see further developments in other areas such as virtual reality (or: augmented reality), artificial intelligence (AI), voice recognition and 3D printing (Van der Elst, 2015; UKCES, 2014b). Further developments in fingerprint sensors and retinal scans will be made, as well as advances in flexible display technology, which will inspire more innovation in wearable devices and other products that will benefit from a lighter, thinner and bendable display (IHS Markit, 2016).

The aging populations and the integration of technology in the healthcare system will cause the healthcare sector to become one of the predominant sectors of the future. It will be necessary to

improve efficiency and healthcare delivery while reducing costs, and it is predicted that mobile health (mHealth) applications will play a major role in the future developments (Sykes, 2014).

Growth in the construction industry is expected to increase by more than 70% to US$15 trillion by year 2025, and will most likely be concentrated in China, USA and India. In addition, a smaller construction market (US$350 billion) comprising Indonesia, Vietnam and the Philippines, is growing by more than 6% per annum (Sykes, 2014).
Pharmaceuticals, automobile assembly, asset management, filmed entertainment and tertiary education are predicted to be some of the most popular industry clusters (definition: geographic concentrations of interconnected companies and institutions in a particular field) in the future (PwC, 2010).

Focus groups conducted in the Hampshire area in July 2016 support empirical evidence (from the quoted sources) although Brexit will now have an impact on the UK economy. Local businesses consider that the following global economies will be important, US, Russia, India, Eastern Europe, Turkey, Asia (South Korea, Philippines, Indonesia, Vietnam), South America (Mexico, Brazil, Peru, Colombia).

3.1.2 Future Hotspots

The most frequently mentioned global hotspots for the future are; USA, Mexico, Brazil, UK, France, Netherlands, Germany, Turkey, Russia, Japan, China, Hong Kong and Singapore. All of these countries are listed among the future top 25 hotspots in 2025, based on the predicted total GDP (McKinsey Global Institute, 2012). Los Angeles, New York, Boston, London, Nanjing, Shanghai, Tianjin, São Paulo, Mumbai and Singapore are expected to house some of the future clusters (pharmaceuticals, automobile assembly, asset management, filmed entertainment, tertiary education) by 2040 (PwC, 2010), but also Saudi Arabia and Malaysia seem to hold great growth potential (PwC, 2016a - retrieved). Brazil might turn into one of the world's leading oil producers, as Rio de Janeiro gives access to some mostly untapped oil fields that could enrich Brazil (Sykes, 2014).

Some of the future megacities with emerging markets and jobs are in Jakarta, Manila, Karachi and Mexico City. These cities will especially draw on technologically skilled young people and mobile adults. Southeast Asian megacities such as Jakarta and Manila will experience increased growth both economically and physically, and they are looking to be the future investment hotspots for technology, finance, real estate, education and industry. Lagos holds Nigeria's banks, financial institutions and corporate headquarters, and has become a hub of high-tech innovation and development, attracting investors and entrepreneurs (The Mover, 2016). Another list ranks New York, London, Singapore, Hong Kong, Tokyo, Sydney, Paris, Stockholm, Chicago and Toronto as the top 10 in city competitiveness by 2025 (The Economist Intelligence Unit, 2013).

3.2 UK Trends

3.2.1 Future Sectors

The most popular sectors predicted to become predominant in the future UK include; health and social care, education, energy, construction, engineering, technology, transport, business services, communication, hospitality, financial services, creative, digital, retail, logistics and manufacturing (Energy UK, 2016a; Pertemps Network, 2016; PwC, 2016b; UKCES, 2014b; Wylie, 2016). Education and health could possibly become the biggest service sectors by 2025, adding more than 1 million jobs. Business services could become the second biggest, creating around 1.5 million jobs, with distribution,

restaurants and hotels potentially coming in as third (PwC, 2016b). (These sources predate the EU referendum.)

However, sectors such as aerospace, automotive, agricultural technologies, information economy and life sciences are also predicted to experience considerable growth, and alongside construction, education, energy and business services, they are part of the government's industrial strategy as sectors with which the government wishes to develop long-term strategic partnerships (GOV UK, 2015). Aerospace, transport and hospitality were also amongst the 10 fastest growing industries, by annual percentage change in output to Q1 2015 (Lloyds Bank, 2015). As part of the industrial strategy, the government will help the abovementioned sectors with support for their research and the technology behind their development, in order to enable the UK to grow and compete with the global markets. This will be even more important post-EU-exit.

Some of the technologies supported by the government include; big data, satellites, robots and other autonomous systems, synthetic biology, regenerative medicine, agricultural technologies, advanced materials and energy storage (BIS, 2012; GOV UK, 2015). An identification of future technologies enables the UK businesses to take advantage of them and drive them to enable future growth. Areas such as synthetic biology, energy-efficient computing, energy harvesting, non-animal technologies, novel imaging technologies, graphene, and quantum technologies are just some of the emerging areas where research could translate into successful commercial products, and potentially turn into billion pound industries (Innovate UK, 2014).

Among the reasons for the success of the abovementioned sectors, is that Britain will move towards a cheaper and cleaner low carbon energy system over the next decade (Energy UK, 2016a). The government will look to remove all coal from the energy system by 2025, which will leave more room for low-carbon energy such as wind, biomass, solar, storage and tidal (Energy UK, 2016b). Engineering will be especially important in the energy sector, with the creation of renewable energy technologies. The development of this sector is being further fuelled by the belief that UK's energy needs cannot be met by any single technology, as fossil fuel availability is reducing and the focus on emission prevention is increasing (Cummins, 2011). (Again, the sources pre-date the EU-referendum and it is possible that emissions targets will be reviewed in the light of the 'exit' decision.)

In addition, technology will continue to become more important in various areas, such as financial technology, education, manufacturing and healthcare. Fin Tech is an example of how technology will reshape financial institutions and the way they build, run and lead their businesses, with the creation of new financial products and services, such as robot financial advisors, online lending platforms, digital mobile banks and the potential of block chain. Block chain could also benefit the healthcare sector, by enabling patients to access their health records. Technology could potentially reduce travelling and waiting times, by making the patients' interaction with their doctor more virtual, while drones could deliver medicine in places with poor infrastructure, and mHealth could track the patient's adherence, dosage, stock and physiological response to the drugs. Also educational systems will experience a technological development, and in the future we can expect more automated self-directed learning, assisted by e-learning, virtual reality and the collection of big data. Furthermore, manufacturing will see more autonomous drones, intelligent robots, 3D printing and sensors (Cummins, 2011; Twenty Recruitment Group, 2014; Wylie, 2016).

3.2.2 Future hotspots

According to the government, the creative and high-tech economies will become the drivers of future growth in the UK, making London and the South East a future hotspot as they hold 43% of jobs in the creative economy. Creative hotspots outside of London/South East include Edinburgh, Manchester, Glasgow and Bristol. High-tech hotspots include Hampshire, Berkshire and Cambridgeshire, but also

the Northern Powerhouse is becoming a technology hotspot, boosting economic growth and creating more jobs. Responses from local businesses concur and suggest that UK hotspots will be mainly in the South of England and in Northern cities such as Manchester, Newcastle and Edinburgh. Hampshire is therefore well placed to grow both in the creative sector and as a technology hotspot. However, alternative hotspots may emerge with better transport links e.g. HS2, linking London, Birmingham and the North.

Meanwhile, the jobs related to health, education and government are the most evenly geographically distributed jobs across the country (Carrey, 2015; Nesta, 2015). London and the South East will also be the hotspot for growth in general high-value jobs (PwC, 2014), causing an increased need for improved housing and infrastructure (Wylie, 2016). London, Manchester, Birmingham and Liverpool could become some of the future investment hotspots (Stephens, 2016), with London and Manchester also being possible hotspots for the strongest emerging innovative ecosystems, along with Merseyside and the West Midlands (UKSPA, 2014). According to telegraph.co.uk, the potential hotspots for job growth in different industries are; Dundee, Glasgow, Edinburgh, Newcastle, Sunderland, Durham, York, Nottingham, Norwich, Cambridge, London, Southampton, Cardiff, Swansea and Cornwall (Chan, 2011).

Another ranking shows the top 10 cities/towns (outside of London) that have continued to grow over the past eight years. When ranked according to recent growth and potential for further, sustainable expansion, the hotspots include; Manchester, Birmingham, Milton Keynes, Bristol, Brighton and Hove, Nottingham, Leicester, Swindon, Peterborough and Cambridge (Buckland, 2014). When ranked according to further dynamic growth potential, the top 10 (outside of London) include; Cambridge, Reading, Manchester, Bristol, Oxford, Brighton and Hove, Milton Keynes, Leeds, Warrington and Nottingham (Buckland, 2014).

From this we can conclude that especially London, the South East, the Northern Powerhouse, Edinburgh, Glasgow, Bristol, Cambridge and Nottingham will be some of the most popular hotspots for the future (Boyce, 2013; Price, 2012).

3.3 Solent Trends

3.3.1 Future Sectors

3.3.1.1 Overview and Strategy

The Solent is an area with strong sectoral strengths, and it is vital that the region knows how to utilise these strengths to their full potential. The development of growth hubs and strategic sectors and clusters is important for Solent's economy to succeed, thus Solent must continue to build on its position as the leading location and growth hub for sectors such as; advanced manufacturing, marine and maritime, transport and logistics, engineering, energy, aerospace, environmental technology and composites. Other important sectors for Solent include; construction, healthcare, digital, technology and computer science, education, life sciences, information economy, creative, visitor economy, business and professional services, and waste (EMSI, 2013; Hampshire Chamber of Commerce, 2016 – retrieved; Solent LEP, 2014, 2016a; 2016d). The research from the focus groups and on-line questionnaire concurs.

The government plans to increase the country's productivity, and as the key partner in the Solent region's economic development, Solent LEP plays a leading role in the area's productivity agenda. Productivity in the Solent area is 12% below the South East average, and 5% below the UK average, and it is estimated that this gap will continue to slowly widen over the forecast period. To raise growth and productivity, Solent LEP will inter alia focus on developing the skills needed for the economy to

succeed and invest in the area's economic infrastructure. They will also build on the area's sectoral strengths and support businesses to innovate, grow and export (Solent LEP, 2016d)

3.3.1.2 Construction and Regeneration

£400 million of local public funding and a £151.9 million government funding through Solent's Local Growth deal, will focus on the improvement of the economic infrastructure and connectivity. Over the lifespan of the Solent Local Growth Deal (2015-2021), the investment can potentially create 6000 new jobs, enable the building of 11000 new homes and generate up to £400 million in public and private investment. Some of the projects in the Growth Deal include inter alia transport and connectivity improvements and two skills centres at the Isle of Wight College and Eastleigh. A National Maritime Systems Centre of Excellence has been planned for Portsmouth, and the development of a Cancer Immunology Centre in Southampton will support innovation in immunology research (Solent LEP, 2016d).

In addition, Business South is supporting and promoting the execution of major transformations in Portsmouth, multi-million pound improvements in Bournemouth, and Southampton's City Centre Master Plan, which will generate £3 billion of investment and strengthen the city's position as the South Coast's economic powerhouse (Business South, 2016a - retrieved). All of these projects will create a significant number of jobs

3.3.1.3 Advanced manufacturing and marine cluster

The marine and maritime sector is central to Solent's economy, and has potential to support significant growth (Solent LEP, 2016d). The Solent area houses 1,750 marine related businesses (Solent LEP, 2016a - retrieved), and 20.5% of the area's GVA is generated from the marine and maritime sector. The sector accounts for up to 40,000 jobs and more than 3,000 businesses in the wider supply chain, making it one of Solent's most important sectors (Business South, 2016b - retrieved). However, the announcement that shipbuilding activity at Portsmouth Naval Base will cease is very likely to change this job activity. Solent will need to look for new commercial opportunities on a global plan, as the proportion of marine workforce is higher here than the national and South East average. This means that the area must prepare for the transition from shipbuilding towards an increased focus on ship repairs, maritime support, intelligence systems and air capabilities. Solent must prepare for this rebalancing of the economy, and secure its valuable economic assets in advanced manufacturing and defence. To assist this transition, the Solent LEP launched a £3.7 million fund from the Government's Regional Growth Fund with the aim to assist small and medium-sized enterprises (SME) in Solent's supply chain, when they recalibrate their business to more sustainable defence/ maritime/ advanced manufacturing/ aerospace/ general services support (Solent LEP, 2016a - retrieved). It is encouraging, therefore, that Land Rover BAR has established its new HQ in Portsmouth.

3.3.1.4 Transport and logistics

The port in Southampton is one of the largest, busiest and most diverse in the UK, and provides 15,000 jobs, directly and indirectly, in the Solent area. In addition, it contributes with more than £1.2 billion of output per annum. It is the busiest cruise port as well as the largest vehicle handling port in the UK, with more than 750,000 vehicle exports. Furthermore, the container terminal is the second largest in the UK, handling almost 50% of the trade with the Far East. These are some of the main reasons why port logistics are of critical importance to Solent. The proportion of transport and warehousing is higher than the national average, yet it is underrepresented in this sector in comparison with the wider

South East, which means that this is also a sector with room for significant growth (Solent LEP, 2016a - retrieved).

3.3.1.5 Low carbon economy

Low carbon and Green Technology are areas of priority in the Future South (formerly Future Solent) Strategy. The aim is to turn these into business opportunities, growth, jobs and manufacturing. Investment in most marine renewables is often risky, but investment at all stages of the development process is crucial for Solent to remain at the forefront of these technologies. New legislation and a rapid rise in the cost of marine fuels have led to an increased focus on energy efficiency and the attempt to decrease sulphur, carbon and other greenhouse releases, through the development of natural gas powered shipping. The Solent's location, research strengths and national centres of excellence make it an obvious strategy to focus investments and innovation on low carbon marine technologies, such as this. The Solent is one of the South East's most densely populated areas, and is expected to experience a rise in buildings and population, with the plan of developing 600 new homes at Welborne from 2016. This, combined with the goal of achieving an above-trend economic growth, will potentially lead to increased carbon emission and use of natural resources. Thus, it is important to focus on the development of low carbon and green technology, as well as building the skills needed for low carbon construction. This means that architects and designers must be trained in working with new materials and to understand the factors behind these materials that contribute to their efficiency. Thus, construction operatives, project managers and site managers across the sector must be taught (or re-taught) and encouraged to adopt new materials and low carbon construction techniques (Solent LEP, 2016a - retrieved).

Future South is a partnership of Hampshire Chamber of Commerce, Solent LEP, the Universities in the Solent region and PUSH. It is an initiative that aims to bring together different projects and actions in order to deliver Solent's vision and key priorities. The hope is to utilise the Solent's resources and establish partnerships between businesses, academia, organisations and authorities in order to achieve a low carbon economy in the region. Small and medium-sized enterprises in the Solent region, who wish to develop new low carbon products and services, have been supported with £3 million, won from the Regional Growth Fund. Furthermore, grants of up to £100,000 were given, with the aim to create 332 new jobs in this sector (Hampshire Chamber of Commerce, 2016 – retrieved).

3.3.1.6 Visitor Economy

The visitor economy is worth more than £3 billion in the Solent economy and supports more than 60,000 jobs. A report by Deloitte from November 2013 predicts that the tourism economy will grow at 3.8% per annum, which means that it will grow faster than manufacturing, construction and retail. At the moment, the UK tourism economy is worth £127 billion and is set to grow to £257 billion by year 2025, which is 10% of UK's gross domestic product (GDP). Furthermore, in 2013 it was supporting 3 million jobs in the UK (9.6% of UK employment) and has been forecast to grow to 3.7 million jobs by the year 2025. Tourism was responsible for one third of the net increase in UK jobs from 2010-2012, which made it one of the fastest growing sectors in the UK in terms of employment. However, the Solent's proportion of this tourism economy is lower than the national average, and in the light of the attractions that the Solent has to offer e.g. the Isle of Wight, marine heritage, proximity to London and other visitor attractions, this may indicate that the tourism sector is underperforming, which means that there is a possibility for significant growth. Even though this sector may be underperforming, it is still a vital part of Solent's rural economy. For instance, it supports more than 20% of the employment on the Isle of Wight, and generates £500 million of direct and indirect expenditure. Solent LEP is

committed to attract more visitors to the area and encourage them to stay longer, by building on the area's natural assets and heritage (Solent LEP, 2016a - retrieved).

Industries related to the visitor economy are among the top ten growth industries predicted for the Solent 2016-19 : restaurants and food service, beverage. Related occupations are also among the top ten predicted for growth in new jobs 2016-19: kitchen and catering assistants, bar staff, waiters and waitresses, and sales and retail assistants.

3.3.1.7 Health

Progress will continue to be made in the healthcare sector. Southampton's hospital has been making innovative progress, including the performance of the first kidney stone procedure by the use of a 3D model and the trial of a new air-cleaning device that aims to cut down on asthma attacks. In addition, University Hospital Southampton NHS Foundation Trust has formed a partnership with the cruise company Carnival, which means that hospital staff is now working with ships' doctors and nurses, to provide various services both on land and at sea. A long-term vision is the development of a health village away from the hospital site. This place would bring together healthcare organisations and commercial enterprises in areas such as rehabilitation, thus combining the benefits of both science and research and transforming the patient care. Progress on this topic has already been made, as the hospital is collaborating with several local companies with diverse developments such as 3D printing, waste to energy and chemotherapy dispensing software among others (Business South, 2016c - retrieved).

3.3.2 Summary

Based on this review of future sectors, we can conclude that especially energy, healthcare, education, construction, business and finance and STEM (Science, Technology, Engineering, Mathematics) related sectors in general, are expected to be predominant on both a global, national (UK) and local plan.

While most of the sectors expected to become predominant in the Solent area are in accordance with those on the national plan, Solent seems to possess some specific sectoral strengths that can prove an advantage if utilised to their full potential. However, productivity in the Solent area is currently below both the UK and South East average, which means that the region must work hard to acquire the necessary skills and knowledge in order to bridge this gap and increase economic growth.

3.4 Evolving Jobs

The future predominant sectors will also determine which jobs will be evolving, and with indicators such as pay, job opportunities and business needs, the future top job areas in the UK could be in; education, healthcare, business, finance, construction, IT, energy, manufacturing, hospitality, defence, transport and logistics and STEM (Science, Technology, Engineering, Mathematics) related occupations (Hawksworth, 2016; UKCES, 2014a).

While these jobs are also applicable to the needs of the Solent, this area will have an additional demand for workers in advanced manufacturing, aerospace and marine and maritime (especially ship repairs and support). Solent LEP will support the growth of the Solent Enterprise Zone with the aim to deliver a world class advanced manufacturing hub in fields such as marine, aerospace and aviation, creating 37,000 jobs by 2026 (Solent LEP, 2016b - retrieved).

By 2025, employment in the UK could grow by 3 million jobs, reaching almost 37 million jobs in total. Education and health could become big contributors to this development, adding over 1 million jobs by 2025 and becoming the biggest service sectors. Meanwhile, business services could create 1.5 million jobs by 2025, making it the second biggest service sector, with distribution, hotels and restaurants coming in as third (Hawksworth, 2016). Especially STEM related occupations will also become more important in the future. As the world becomes more technological and automated, occupations in IT will increase, as will the need for cyber security, development of AI and strategies for the future. To address environmental issues, we will possibly see a creation of new construction methods and standards for modern buildings, increasing the job opportunities in construction. The increased focus on renewable energy will also lead to the increased need for engineering, production, installation and maintenance of renewable energy technologies (UKCES, 2014a). Also project managers will be in high demand, but the demands and skills needed will vary by sector and location. Developed countries that are still recovering from the global meltdown, will experience an increased pressure on organisations' finances, which will lead to the need of project practitioners that are skilled in thinking strategically when executing projects. An especially important skill will be the ability to convert strategy into action. Project managers will need to be able to grasp the larger ecosystem of their project, to enable them to create more agile processes that will lead to better outcomes (Sykes, 2014).

4. Future Skills and Potential Disruptors

4.1 Future Skills Needed Globally

Many organisations are facing an uncertain future due to geopolitical headwinds, instability in Europe, slowing economies in Asia and job disruptions – a situation only exacerbated by the increasing automation, digitisation and globalisation. As a result, businesses are experiencing a shift in the skills that drive their performance and the talent pools that will lead to future growth, making it necessary to re-examine talent development and the way we think about work and employment (Mercer, 2016). Mercer's 2016 Global Talent Trends study, with data from more than 1,730 HR leaders and 4,500 employees across 15 countries (Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, Singapore, South Africa, Sweden, UK, USA), found that an entire 85% of the participating organisations believed that their talent management programs and policies needed an examination.

Research shows that employers are especially looking for workers with analytic, leadership and people development skills, along with skills in how to manage a complex, global organisation. This is especially the case in industries that are facing the prospect of disruptive innovation. When asked which skills were in high demand over the next 12 months, organisation responses showed that leadership/ inspirational leadership (43%), coaching/ people development (40%), analytic skills (34%), design thinking/ innovation (33%) and global mindset (31%) were the most popular skills in demand (Mercer, 2016). This indicates that soft skills will be increasingly important in a future where technology will be able to replace many hard skill tasks. Local businesses also see a move towards self-employment and collaborative specialist teams working with schools, colleges and universities.

4.2 Future Skills Needed in the UK

The specific skills needed in the UK by 2030 seem to vary across sectors and occupations. However, some similarities and repetitions seem to be apparent. Across the future predominant sectors, there will be a need for better skills in technology, such as ICT and handling of robots, as a result of the increased integration of technological equipment. While younger generations might already possess such skills, older generations will need an up-skilling to keep up with the technological advancements. The widespread use of IT means that there will also be a need for skills in analysis and translation of vast amounts of data, as the data collected and stored will increase drastically. STEM skills in general

will be in high demand across all sectors, as will installation, maintenance and repair skills due to inter alia the increased automation, integration of technology as well as renewable energy. Also cyber security and digital forensic skills will become increasingly important with the technological developments.

Soft skills will still be essential in tasks across all sectors that cannot (yet) be replaced by machines. These include skills such as management, creative and critical thinking, research and analysis, problem solving, guidance and cultural awareness. Also entrepreneurial and self-organisation skills will be in demand as the environment shifts from traditional employment contracts to more flexible, project-based employments (UKCES, 2014b).

4.3 Future Skills Needed in the Solent

Several sectors in the Solent region are experiencing skills gaps in their workforce. Thus, it is necessary to get a clearer idea of the businesses' needs and the qualifications they are looking for, as a continuation of this will induce serious problems for the region's productivity. Quality, innovation, knowledge creation and application are important if the South's businesses wish to compete in the global economy, but the key differentiator will be the people in the workforce (Business South, 2016d - retrieved). Their skills are essential for a productive and growing economy, and require high levels of education. To address this, Solent LEP launched the Solent Skills Strategy in March 2014, as a part of Transforming Solent, the Strategic Economic Plan. The main issue in Solent's productivity performance is the region's under-performance in higher-level skills, especially those STEM related, which are essential to economic growth. The recent evaluation of the Skills Strategy therefore suggested an increased focus on these skills (Solent LEP, 2016d).

Colleges across the Solent region have joined forces to collaborate on a 'Skills for Growth' project with Solent LEP, and are offering a range of course units from their technical programmes. The intention is to broaden the knowledge of the region's workforce, grow their talents and bridge the existing skill gaps. Current course units include; Business Improvement Techniques, Engineering, Management, Performing Manufacturing Operations, Port Operations and Welding (Solent Growth Hub, 2016a - retrieved). All of these courses address important aspects of the skills in high demand in the Solent region.

Leadership and management skills will also be important as these influence the businesses' performance and enhance competitiveness, thus being strongly correlated with growth and success. Investments in training, resource planning and management structures can positively influence businesses' performance, and will be especially important for SMEs' growth potential in the Solent. By stimulating innovation and raising competition, SMEs contribute to growth and opportunities for job creation. Also entrepreneurship will be important for economic growth, along with skills training in how to boost overseas trade. A seemingly low ambition for enterprise entrepreneurship suggests that measures must be taken to bridge this ambition gap. This will require early intervention and the provision of enterprise experience for young people (Solent LEP, 2016b - retrieved).

4.4 Potential Disruptors to Employment, Skills and Competencies

4.4.1 Overview

Future disruptions to the UK employment, skills and labour market can be difficult to predict, but it is possible to survey opportunities and risks and thereby make an estimation of potential disruptors, the following being applicable to 2030; reverse migration, employees' changing values, zero-hour contracts to become the norm, anywhere and anytime skills delivery, AI and robots, de-globalisation,

geographically alternative centres of excellence, disrupted internet developments, resource conflicts or climate disasters to threaten supply, and partial fragmentation of the EU (UKCES, 2014b).

4.4.2 Reverse Migration

Low economic growth in the Western countries could lead to a reverse migration, where immigrants seek a return to their original countries to find work. This disruption is feasible as job opportunities in Western countries have suffered due to the economic crisis, while job markets have been growing rapidly in emerging countries (UKCES, 2014b).

4.4.3 Employees' Changing Values

More people want to realise their personal values in a meaningful way at work, which means that they might select their employer based on their value priorities. This will be evident for workers in both high and low skilled positions, which could disrupt the traditional employers' market. Recent research shows that students and workers have a high preference for companies that act in a social and environmental manner (Net Impact, 2012). This means that organisational cultures will be forced to adapt their corporate values and policies. Generation Y is more globally minded, and wants more than just financial rewards from their work-life, including a greater flexibility (Deloitte, 2011; PwC, 2013; UKCES, 2014b). These factors apply to those with higher skills in the 'global war for talent'.

4.4.4 Zero-hour Contracts Become the Norm

As the job market becomes more competitive, employers will be able to structure employment conditions after their own needs, which would lead to a rise in zero-hour contracts and other flexible arrangements, as well as a decline in skills investment. Workers, especially those competing for low-skilled jobs, will become pressured to accept employment contracts that benefit the employer much more than them as workers (Mosca & Wright, 2011; UKCES, 2014b).

4.4.5 Anywhere, Anytime Skills Delivery

Traditional education and other training providers are challenged by the competition of new non-traditional learning opportunities, resulting from inter alia online courses enabled by modern technology. Massive Open Online Courses (MOOCs) can provide people with online teaching materials and forums, thus making distance learning possible (UKCES, 2014b). The challenge here is to convert casual uptake into achievement and monetise the latter. Many organisations see MOOCs mainly as a promotional tool rather than an alternative delivery method for standard students.

4.4.6 Artificial Intelligence and Robots

Advancements in robotics, AI and algorithms facilitates the automation of processes and services. Robots are being employed in various sectors, e.g. manufacturing, healthcare and agriculture, and AI applications are used in various tasks, e.g. to facilitate the capture, structure and analysis of big data (UKCES, 2014b). These new and automated technologies could boost productivity but reduce the number of jobs in manufacturing to around 2 million by 2025 (Hawksworth, 2016). The increasing automation in manufacturing might also lead employers to become more unwilling to invest in skills and without this, low skilled workers will quickly become redundant (UKCES, 2014b).

A continuation of austerity measures until 2020 could result in the loss of 150,000 jobs in defence, public administration and social security (Hawksworth, 2016). A continuation of this technological development could eventually lead robots to take on tasks that we previously thought could only be executed by humans. If this becomes relevant to the future jobs, we will need to rethink areas such as education, economic and social safety, pension systems etc. as these will necessarily become influenced by this technological revolution (PwC, 2014; Shankland, 2012; UKCES, 2014b; Van der Elst, 2015).

With the technological developments and competition, middle-tier management roles are strongly reducing, creating a potential danger for an even greater divide between rich and poor. This change will require the government to come up with a long-term strategy (Wylie, 2016).

4.4.7 De-globalisation

An increase in protectionist and nationalist tendencies, caused by a sustained global economic crisis, could eventually negate international trade and cooperation (UKCES, 2014b). The UK EU-referendum result, resurgence of nationalist parties in other European countries and election of Donald Trump in the USA are testimony to a populist anti-globalisation sentiment. However, it is yet to be seen whether isolationism can combat globalisation in an era when global corporations have more economic and political power than some sovereign nations.

4.4.8 Geographically Alternative Centres of Excellence

As emerging countries continue to develop their infrastructure, new cities may take the lead in specific areas of innovation and production. Elements such as a supportive government and cheaper production and labour costs attract an increasing number of foreign investments and business start-ups. Asian financial cities, such as Shanghai, Hong Kong and Singapore, are expected to hold the future top global finance centres by 2022, due to their favourable taxes and bank friendly environment (Jeffs, 2012). These emerging markets thus become a disruptor to the global competition. PwC predicts six of the world's ten largest clusters to be located closer to these emerging growth markets by 2040, thus attracting the best talent and weakening the position of older clusters (PwC, 2010, 2014; UKCES, 2014b).

4.4.9 Disrupted Internet Developments

The development of the internet may be disrupted by cyber-crime, targeting internet structures, individuals and organisations. Cyber-crime has continued to grow and is becoming more sophisticated. Attacks and espionage are expected to threaten the internet and networked transport infrastructure to a much greater extent by 2030 (NIC, 2012; UKCES, 2014b).

4.4.10 Resource Conflicts or Climate Disasters Threaten Supply

As the global population grows so do the resource requirements. The natural deposits of many resources are getting exhausted and harder to exploit, while consumption and living standards across the world continue to increase (Tamminen, 2013). The limitation of future resource supplies may give rise to conflicts, making it necessary for countries and organisations to come up with a strategy on how to overcome this (PwC, 2014; UKCES, 2014b).

4.4.11 Partial Fragmentation of the EU

The UK's decision to leave the EU could lead to the emergence of a core Eurozone single market and a detached UK (UKCES, 2014b).

5. Challenges for Employers, Schools/Colleges and HE Institutions

Identifying the sectors, jobs and skills needed for the future is an important step in creating economic growth. But knowing which skills to develop is one thing, actually obtaining them is another, and this final step is causing problems for several sectors. If this challenge of employee skills continues, it will consequently have great implications for industry in terms of future success and economic growth.

According to research by the British Chambers of Commerce (BCC), many employers are frustrated by young people's lack of skills and work experience (British Chambers of Commerce, 2016c - retrieved). The BCC Workforce Survey 2014 found that 88% of businesses think that students who have just left school are unprepared for the workplace, especially in regards to soft skills such as communication, resilience, teamwork and insights into how to act appropriately in the workplace (British Chambers of Commerce, 2016b - retrieved), which implies that educational institutions must work harder to increase the focus on soft skills.

Many businesses believe that more can be done in order to prepare young people for their future workplace, but young people are often denied the experience and interaction with work, which in return leads to difficulties to live up to the expected standards of their employers (British Chambers of Commerce, 2016c - retrieved). The BCC and Chamber Network believe that business, education and the government share the responsibility to address this problem and bridge the gap between business and education. Enhanced collaboration between education providers and the business community will be necessary to better equip young people with skills and knowledge that will help them in their transition to work (British Chambers of Commerce, 2016c - retrieved).

An under-qualified workforce is already causing big problems for Solent's productivity, growth and future success, thus, it is crucial to create a better dialogue between businesses and education, to find out which skills and qualifications businesses need in their workforce. Together with Southampton Solent University, Business South is trying to improve just this, with hopes of creating a stronger workforce for the future. Some of their initiatives include the HR Forum where academics, business people and HR professionals are brought together, as well as a programme involving Primary and Lower Secondary Science and Maths, to address the long-term Local Enterprise Partnership's need for more students in STEM related careers (Business South, 2016d - retrieved). Enterprise M3 LEP also promotes the development of greater technical skills and capabilities in STEM subjects, as these will be vital for the future productivity. However, big gaps in STEM qualifications among the current workforce pose a challenge to this (Enterprisem3, 2016 - retrieved).

To address this challenge, it will also be necessary to look at the current gender imbalance in STEM careers. Research from Mercer's study, *When Women Thrive,* supports the reality of this gender imbalance. Based on data from more than 600 global organisations, they found that on a global plan, women only make up 33% of managers, 26% of senior managers, and just 20% of executives. This might be due to women being more negatively impacted by labour market disruptions, and existing gender role biases among others (Mercer, 2016). Addressing this problem will be necessary for all science-related sectors, in order for them to access the entire talent pool instead of just half of it. Science-related sectors are already suffering from a short supply in STEM skills, and forecasts predict that there will not be enough people to fill the positions needed in these sectors. The UK needs more than 100,000 new STEM graduates each year in order to meet demands, but only 80% of this figure is currently being produced (British Chambers of Commerce, 2016a). In 2014, five Chambers of Commerce began a project with the aim to tackle this gender imbalance in STEM careers. The project was supported by the Government Equalities Office (GEO), and involved the Chambers to support schools by expanding the career horizons of female pupils (British Chambers of Commerce, 2016c - retrieved).

Solent LEP is also working to support the development of a world-class workforce, and so they have published their Solent Skills Strategy. The strategy sets out the challenges of the Solent area, labour market opportunities, highlights strategic priorities and actions, and allows European and national funding to be targeted on local priorities. To succeed with the strategy, Solent LEP has formed an alliance with three Solent based universities, a network of Further Education colleges, private learning providers and schools (Solent Growth Hub, 2016b – retrieved; Solent LEP, 2016c - retrieved).
In addition to the Solent Skills Strategy, an Enterprise Zone Skills Plan has also been developed. This Skills Plan aims to understand the challenges that the Solent Enterprise Zone and its surrounding area are facing, to illuminate the skills needed by businesses, and to assess the available resources to meet these needs (Solent LEP, 2016c - retrieved).

These efforts to connect educational institutions and businesses will be mandatory to overcome future skill gaps, and greater efforts must be made by schools and educational institutions to implement education and training in the skills needed, once identified.

6. Potential Job Market for the Future

The output from the data collection from the focus groups and on-line questionnaire suggests that jobs will need to evolve with some jobs being completely new and others where their application will be different. Either way an educated workforce will be an essential component. Respondents suggest that there are likely to be more self-employed, ever smaller organisational units and more people employed looking after others, in care, therapy, coaching, personnel training and so on. More women will be enabled to start their own companies, as flexibility finally comes into the equation as technology and applications provide the ability to trade 24/7/365 to allow them to fit around family life.There will also be an increase in freelancers and they will all need to be multi-skilled.

7. Skills, Competencies and Behaviours Towards 2025

7.1 Skills and Competencies Needed as we Move Towards 2025

In a word frequency search across the data collected from respondents, the development of skills is clearly important. These include the skills necessary to prepare for the future job market and largely lie in the development of technology and digital skills allied with analytical skills (with big data). However, respondents also indicated that the development of soft skills is a high priority.

Customers will become more demanding as technology provides immediacy of service provision and social media will continue to evolve and dominate, which will require the development of customer service skills and competencies. People will also need to be able to work in an environment without boundaries and so "human" competencies such as communication, leadership, change management, people management and transferable skills will become particularly relevant. People will also need to continuously learn new skills and adapt to changing environment. Sales and marketing skills were also mentioned by several respondents.

7.2 Skills and Competencies that may Become Redundant

Respondents suggest that manufacturing will almost all come from emerging markets and that most repetitive labour intensive jobs will be automated. A range of routine administrative roles/skills was also nominated by respondents, including variously: legal (lower level) and auditing/accounting skills; low tech call centres; basic IT; (taxi) driving; delivery services; personal assistants; receptionists; administrative/clerical; translators/languages; manual labour building skills; sales assistants. Soft skills that currently can’t be emulated by robots will be important. Most respondents felt that soft skills were

more important than technical ones, which can mostly be learnt, although some employers saw technical skills as predominating.

7.3 Changing Employers' Behaviours towards 2025

Employers suggest that there needs to be greater flexibility and self-employment along with the need to get sharper with digital marketing and social media understanding. It was suggested that women may be better at adapting their behaviour to change. HR processes will need to change with the expansion of employees wanting a better work-life balance and with employees being more mobile geographically. More investment will be needed in workforce planning and development, especially higher level skills. Talent management, mentoring, coaching and motivation will be part of strong employer brands. Innovation and R&D will require more time.

7.4 Educational Institutions

Respondents suggest a seismic shift in what and how educational institutions teach the skills and competencies businesses need and suggest a number of different ways in which this could be achieved. They also see that they will need to become more involved in education via collaboration.

Businesses require more consistent quality and skills from graduates. Improving standards are required everywhere. They also see a need to consider commercial needs (more) and teach learners for new technology roles. Respondents also underline the need to develop the soft skills mentioned above. Curriculum should change in line with forecasted skills needs and also ensure that people skills, project management, financial and business skills are core to courses. Links with growth industries should develop, particularly through business people speaking with students. STEM subjects should be contextualised (especially for females) with applications and roles in industry. Innovative delivery of learning should be developed and inspirational teachers nurtured. Emphasis should be placed on developing the whole person, with emphasis on thinking rather than knowledge and team-working rather than individualism.

Some input was made on modes of learning, with some respondents thinking that the internet or You Tube will play a larger part. Learning might be in different phases/periods, with more detailed expertise developed later in life. Accelerated learning, compared with the standard three-year degree, was also advocated by one correspondent and flexibility on hours of operation by another. In general, respondents advocated more input from business and more listening from education and some suggested more education in entrepreneurship. Placements in local companies were valued by some.

In fact, many of the above suggestions are already available or in development, so education might argue that closer engagement with/of employers would be beneficial to understand the current position and develop it further.

7.5 Businesses' Requirements of Public Authorities

When asked what public authorities would need to do differently, respondents required many changes. Several asked that they listen to business more and respond accordingly. Suggestions for the latter encompassed increased flexibility (including funding), improved customer service (not through outsourced FM), keeping pace with public requirements and changing customer demand, reducing

bureucracy, being less intrusive and much more efficient, being more collaborative, building coalitions, facilitiating rather than controlling, being project based and providing more information.

In more concrete terms, suggestions for financial areas were to work more openly with contracts and budgets on an open, public ledger (or distributed ledger). Another suggestions was to change the procurement approach to measure value and impact and not purchase price. A further respondent asked that public authorities act as a broker between other organisations and deliver funding rapidly to projects that are on strategy.
In terms of education, there was a request to lift funding restrictions on Academies to enable them to generate additional revenue and reflect their catchment area's needs more effectively. Another respondent saw that public authorities would no longer provide educational services and other services deliverable by the private sector. Another foresaw a move to home schooling. An impact of technology should be web pages on skills and careers for school students. There was also a plea for more core support for the work of Education Business Partnerships which look to engage business with schools to develop skills. More generally on skills, there was a suggested need to provide portals/websites linking supply and demand. Allocation of planning resources and funds for changes in the landscape around future job markets and skills was also seen as a focus.

In terms of economic development, respondents made several suggestions including provision of more small spaces for temporary work, supply of suitable buildings for the way that businesses will operate (in future) and to investigage legislation regarding homeworking. Views expressed included that public authorities would need to work closely in partnership with education and employers to offer an attractive environment and infrastructure in the area in order to secure the right workforce and keep the area relevant to industry needs. Another respondent felt that public authorities should work with smaller local businesses to keep income in the area. Incentives should be offered to graduates and students to stay in the area. Taxes would need to target provision of a social buffer for an increasingly self-employed workforce, according to another response.

8. Conclusion

Respondents to the focus groups and on-line questionnaire generally agree with the empirical evidence. There is a big job to be done re-structuring the relationship between educators and employees in order to provide future graduates with the right skills and competencies for the roles that will emerge in 2025. Businesses also have a duty to start adapting towards what 2025 may look like in terms of how to take advantage of global economic hotspots, a mobile workforce which does not rely completely on employed people, developments in technology and the need for the development of soft skills.

-END-

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Future Predominant Sectors, Hotspots and Evolving Jobs

Annex

Questions put to Businesses

1. Where do you think the global hotspots will be in 2025?
2. Where do you think the UK economic hotspots will be in 2025?
3. Which industry sectors do you see as becoming predominant towards 2025?
4. What kind of jobs do you see evolving in the next ten years – global?
5. What kind of jobs do you see evolving in the next ten years – UK?
6. What kind of jobs do you see evolving in the next ten years – Solent?
7. Are these jobs different or the same from the ones we can identify with currently?
8. What disruptors do you anticipate will affect employment, skills and competencies as you move towards 2025? E.g. technological developments, global collaborations, etc.
9. For your sector/business what are the skills and competencies you will need to build on towards 2025? E.g. technical, soft/hard skills?
10. What skills and competencies do you consider will be largely redundant in 2025?
11. What will be your priority between soft and technical skills?
12. How will employers need to change their behaviours to adapt to the new 2025 landscape?
13. How will schools, colleges and HE institutions need to adapt?
14. What will public authorities need to do differently?
15. Are you a large firm (250+ employees), medium firm (50-249) small firm (10-49) or micro enterprise (1- 9)?
16. Where are you geographically located in the Solent region (post code)?