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Economic Impact of Satellite Broadband in Europe: EXECUTIVE SUMMARY

*Prepared by Adroit Economics and Point Topic
For and on behalf of*

BRESAT

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1. Introduction

- 1.1 This paper sets out the results from Adroit Economics' and Point Topic's satellite broadband economic impact model. The model estimates the economic impact (GVA and associated jobs), that could result if satellite broadband is used to provide fast broadband (30 Mbps) to all SMEs¹, farms and households, in areas that are expected to have either no, or only standard terrestrial (fixed/wireless) broadband coverage by 2020, in each of the EU28 countries.
- 1.2 This report is a summary – it can also be read in conjunction with the full technical report, which will be available on the BRESAT website.
- 1.3 This work has been carried out by Adroit Economics Ltd, in association with Point Topic on behalf of BRESAT. Dr Steve Sheppard of Adroit Economics Ltd is a member of the BRESAT policy group, which is charged with advising on future EU-wide satellite broadband policy².
- 1.4 For further details, please do not hesitate to contact us:
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¹ Small and medium sized enterprises

² Our satellite broadband impact model is based on a wider broadband impact model, developed by Adroit Economics in association with Point Topic, which estimates the economic impact of investment in all types of broadband, across the EU.

2. Satellite is vital to meeting the EC 2020 digital agenda targets

The EC's 2020 Digital Agenda target of 30 Mbps or more for all, will not be met without extensive use of satellite broadband – under the most optimistic expectations, 22.5 million SMEs, farms and households will be in areas that don't have terrestrial broadband services of 30 Mbps by 2020.

- 2.1 The European Commission, recognising the growing importance of fast broadband available to all businesses and households, has set consumer broadband speed targets for all of Europe. Specifically the EU 2020 Digital Agenda says that broadband download speeds of 30 Mbps or more should be available to all by 2020.
- 2.2 The latest assessment of terrestrial network rollout plans and coverage by 2020, undertaken by Point Topic, suggests that these targets will not be met by conventional fixed and wireless networks.
- 2.3 Point Topic's coverage mapping exercise is based on 4 main broadband download speed categories:
- (i) no service due to no coverage
 - (ii) standard service of 144kbps-30Mbps
 - (iii) superfast (also termed next generation access (NGA)) of 30-100 Mbps service
 - (iv) ultrafast of 100 Mbps plus
- 2.4 Neither (i) nor (ii) meet the EC's 2020 Digital Agenda targets of 30 Mbps or more download speed for all³.
- 2.5 The numbers of SMEs, farms and households that will be in areas that do not meet the EU's 2020 30 Mbps for all targets, are substantial:
- 12 million SMEs and farms will be in areas that do not meet the EC's 2020 Digital Agenda targets of 30 Mbps or more download speed for all
 - = By 2020, 277,000 SMEs will be in areas, still with no terrestrial broadband coverage, and a further 1.4m will be in areas with only standard terrestrial broadband coverage
 - = By 2020, 3.1m farms (and related businesses) will be in areas, still with no terrestrial broadband coverage and a further 7.2m will be in areas with only standard terrestrial broadband coverage
 - = This means that a total of 1.7m SMEs and 10.4m farms will be in areas where terrestrial broadband coverage does not meet EU broadband policy objectives for 2020
 - 10.5 million households will be in areas that do not meet the EC's 2020 Digital Agenda targets of 30 Mbps or more download speed for all
 - = By 2020, 1.5m households will be in areas, still with no terrestrial broadband coverage, and a further 8.9m will be in areas with only standard terrestrial broadband coverage
 - This means that, **in total, 22.5 million SMEs, farms and households (8.9%) will be in areas that are not expected to meet the EC's 2020 Digital Agenda targets of 30 Mbps or more download speed for all⁴.**

³ Point Topic's coverage mapping splits each of the above speed ranges down further, into 5 Mbps bandings and their latest coverage mapping suggests that by 2020, 80% of those in areas with a standard service will be able to access no more than 10-15 Mbps download speeds. This is considerably below the EC's 2020 target of 30 Mbps plus

⁴ This figure is based on Point Topic's high coverage scenario. The high scenario reflects the published/stated plans of the Teleco industry. Point Topic has also produced a medium and low scenario. The medium scenario reflects Point Topic's considered view of the most likely scale of rollout that will actually be achieved in 2020 given the difficulties and issues

Figure 2.1

EU28 Countries - Coverage by 2020 (Point Topic data)				
Number of households and businesses	Whole country	No terrestrial broadband	Standard terrestrial broadband	No + Standard
Households	210,716,907	1,549,511	8,936,244	10,485,755
SMEs	30,754,504	277,415	1,422,493	1,699,907
Farms	12,172,175	3,144,920	7,223,921	10,368,841
SMEs + Farms	42,926,680	3,422,334	8,646,414	12,068,749
Smes+Farms+Households	253,643,586	4,971,845	17,582,658	22,554,503
EU28 Countries - Coverage by 2020 (Point Topic data)				
Number of households and businesses	Whole country	No terrestrial broadband	Standard terrestrial broadband	No + Standard
Households	100%	0.7%	4.2%	5.0%
SMEs	100%	0.9%	4.6%	5.5%
Farms	100%	25.8%	59.3%	85.2%
SMEs + Farms	100%	8.0%	20.1%	28.1%
Smes+Farms+Households	100%	2.0%	6.9%	8.9%

typically faced by the Teleco industry when investing in major network expansion. Past trends suggest that rollout targets are not always fully achieved. The medium coverage scenario reflects this.

3. Satellite broadband can fill these gaps.

Modern satellites deliver fast, reliable consumer broadband at similar prices to main stream DSL and cable services

- 3.1 We are advised by the satellite industry that today's satellite broadband is fast (20-30 Mbps or more), it is uncontended unlike most fixed network services, it is reliable, the monthly tariff is similar to many DSL and cable services, and it is available now.
- 3.2 Many people, including policy makers either don't know about satellite broadband or think that it only delivers poor bandwidth, that it is unreliable and expensive. This used to be the case, in the early days of satellite technology, but this is not the case today. Thanks to K-band technology, satellites now deliver fast, reliable consumer broadband at similar prices to main stream fixed and wireless networks.⁵
- 3.3 Moreover, the industry tells us that improvements in satellite technology are expected to increase both download and upload speeds in the near future and a series of planned launches will further increase capacity. And in parallel, we are advised by the industry that a new generation of satellites is being developed, coupled with new orbit patterns, which together will enable satellites to deliver speeds of 100 Mbps or more.

⁵ The full technical report accompanying this summary report sets out findings from recent speed tests and other commentary on what satellites can do, drawn from the literature, from the work of SABRE (a parallel satellite policy group to BRESAT) and from what members of the satellite industry have told us. From this analysis, the only drawback of satellite broadband appears to be higher latency (response) times which can cause certain problems when trying to play games online. But we are advised that technology developments are anticipated to bring latency times down.

4. The economic impact of Satellite broadband across the EU28

Satellite broadband could fill the EC Digital Agenda 30 Mbps for all gap; if it did so this could generate £22-31bn GVA

- 4.1 Adroit Economics has, over the last 10 years, been modelling the economic impact of the growing digital economy, and within this of increased take up of broadband and most recently, of faster broadband.
- 4.2 As part of this work we have extensively reviewed the growing evidence base (both the international literature and local research) and developed a series of techniques for estimating/ modelling the economic impact that derives from business take up and use of broadband (particularly SMEs) and of the benefits of broadband to households.

There is now a substantial body of international research which shows that access to faster broadband is essential for business competitiveness and growth and that households increasingly rely on faster broadband. Some studies estimate the economic impact associated with faster broadband, suggesting that increased take up of fast broadband by firms and households will boost GDP/GVA⁶ and jobs. The full technical report accompanying this summary report sets out the findings from our review of the international literature

- 4.3 Building on this expertise, as part of our work for BRESAT, Adroit Economics, in association with Point Topic, has developed a series of techniques (models) designed to estimate the potential economic impact of Satellite broadband, across the EU28 countries.
- 4.4 Using this model, we estimate that if - all SMEs, farms and households in areas expected to have either no terrestrial broadband coverage or only standard terrestrial broadband coverage by 2020 across the EU28 countries - were to take up Satellite broadband, **that this would generate 22bn⁷ to 31bn⁸ euros benefits per year.** This represents an increase in total EU28 GVA (gross value added) of approximately one quarter percentage point.
- If all SMEs & farms in areas expected to have either no or only standard terrestrial broadband coverage by 2020 were to take up satellite broadband services, this would potentially boost GVA across the EU28 by 7.1bn euros (20 Mbps service) or by 8.7bn euros (30 Mbps service)
 - If all those households in areas expected to have either no or only standard terrestrial broadband coverage by 2020 were to take up satellite broadband services, this would provide collective benefits of 15.6bn euros (20 Mbps service) or 22.8bn euros (30 Mbps service).

⁶ GDP=Gross Domestic Product...the overall measure of the size of a country's economy; GVA=Gross Value Added...a similar measure to GDP but less certain items such as taxes and grants for example...GVA is the most commonly used figure to represent wealth creation in an economy.

⁷ This figure is based on satellite download speeds of 20 Mbps

⁸ This figure is based on satellite download speeds of 30 Mbps

Figure 4.1

Economic impact if all SMEs, farms and households in areas that are not expected to meet 2020 broadband coverage targets via terrestrial broadband, were to take up satellite broadband			
EU28 Countries	20 Mbps Satellite Service		
	No broadband	Standard	No + Standard
Household benefits (euros)	5,271,550,325	10,232,027,799	15,503,578,125
SME benefits (GVA uplift) (euros)	450,377,153	741,427,207	1,191,804,360
Farm/related businesses benefits (GVA uplift) (euros)	3,928,846,653	2,012,232,454	5,941,079,106
SMEs+Farms	4,379,223,806	2,753,659,661	7,132,883,467
Total economic benefits	9,650,774,131	12,985,687,460	22,636,461,591
	30 Mbps Satellite Service		
	No broadband	Standard	No + Standard
Household benefits (euros)	6,150,142,046	16,620,506,649	22,770,648,695
SME benefits (GVA uplift) (euros)	499,866,869	1,033,368,777	1,533,235,645
Farm/related businesses benefits (GVA uplift) (euros)	4,299,953,752	2,820,582,622	7,120,536,374
SMEs+Farms	4,799,820,621	3,853,951,399	8,653,772,019
Total economic benefits	10,949,962,667	20,474,458,048	31,424,420,715

Country-breakdown – for 30 Mbps satellite service

4.5 The following table shows the GVA uplift that could be achieved in each EU28 country, if all SMEs, farms and households, in areas expected to have either no, or only standard terrestrial broadband coverage by 2020, were to take up and fully utilised fast satellite broadband (30 Mbps download).

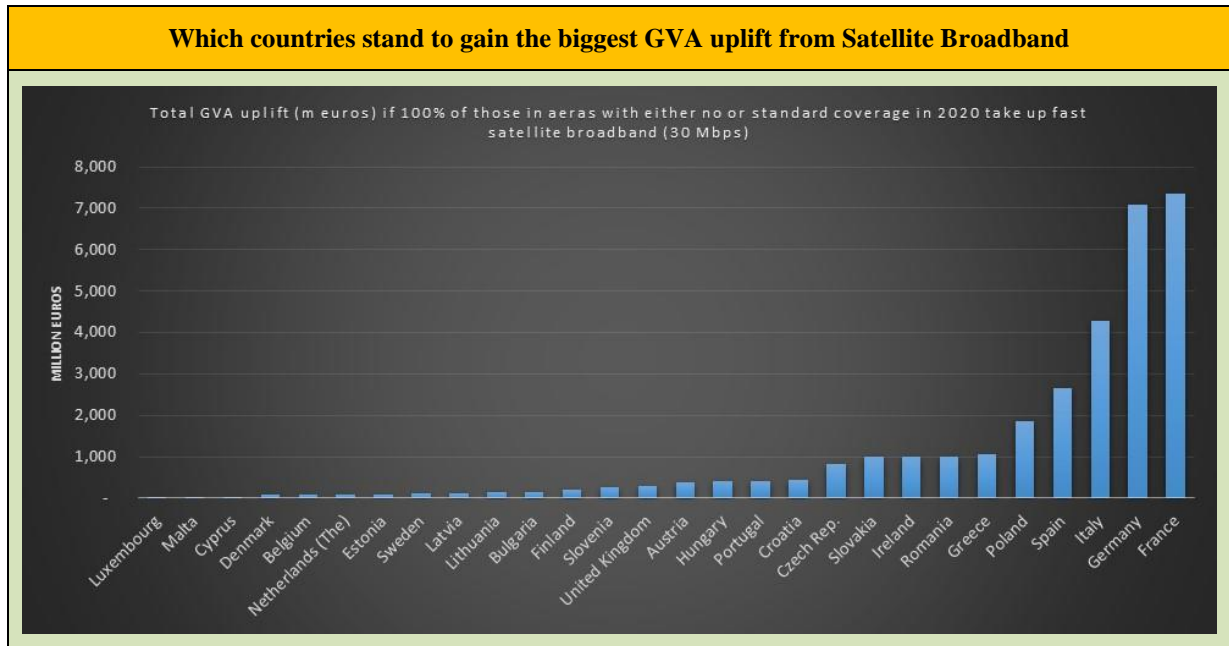
Figure 4.2

GVA uplift if 100% of SMEs, farms and households in areas expected to have either <u>no or only standard</u> terrestrial broadband coverage by 2020 were to take up 30 Mbps satellite broadband				
<i>Euros</i>	<i>SMEs</i>	<i>Farms</i>	<i>Households</i>	<i>Total</i>
Austria	8,749,596	244,246,387	134,321,831	387,317,815
Belgium	2,402,724	64,643,527	30,428,135	97,474,385
Bulgaria	1,473,379	90,134,422	43,624,442	135,232,243
Croatia	21,443,528	53,271,236	375,652,788	450,367,552
Cyprus	65,088	26,895,308	691,054	27,651,450
Czech Rep.	42,364,611	6,790,929	764,742,445	813,897,984
Denmark	-	73,774,421	-	73,774,421
Estonia	6,512,768	4,132,026	88,639,884	99,284,677
Finland	6,232,540	83,244,143	102,662,621	192,139,304
France	439,496,156	572,437,400	6,340,617,038	7,352,550,594
Germany	373,633,066	489,963,562	6,234,477,093	7,098,073,722
Greece	4,336,286	624,285,257	440,977,227	1,069,598,771
Hungary	14,240,179	154,506,466	236,513,704	405,260,349
Ireland	53,980,862	332,443,311	608,918,059	995,342,231
Italy	240,304,204	1,240,730,740	2,804,304,505	4,285,339,448
Latvia	4,494,557	22,280,679	87,827,038	114,602,274
Lithuania	5,855,514	58,197,934	65,996,055	130,049,504
Luxembourg	-	2,783,959	-	2,783,959
Malta	-	10,919,078	-	10,919,078
Netherlands (The)	-	98,283,521	-	98,283,521
Poland	79,299,486	320,354,761	1,458,568,523	1,858,222,770
Portugal	12,677,162	232,287,036	172,378,832	417,343,031
Romania	9,943,465	797,337,653	200,708,709	1,007,989,827
Slovakia	66,221,904	5,984,292	919,698,668	991,904,864
Slovenia	14,854,973	58,367,005	179,582,342	252,804,319
Spain	124,388,972	1,055,324,740	1,479,317,702	2,659,031,413
Sweden	-	110,395,123	-	110,395,123
United Kingdom	264,626	286,521,459	4,601,104	291,387,189
Total GVA uplift (euros)	1,533,235,645	7,120,536,374	22,775,249,800	31,429,021,819

Source: Adroit Economics/ Point Topic satellite broadband economic impact model. Oct 2014

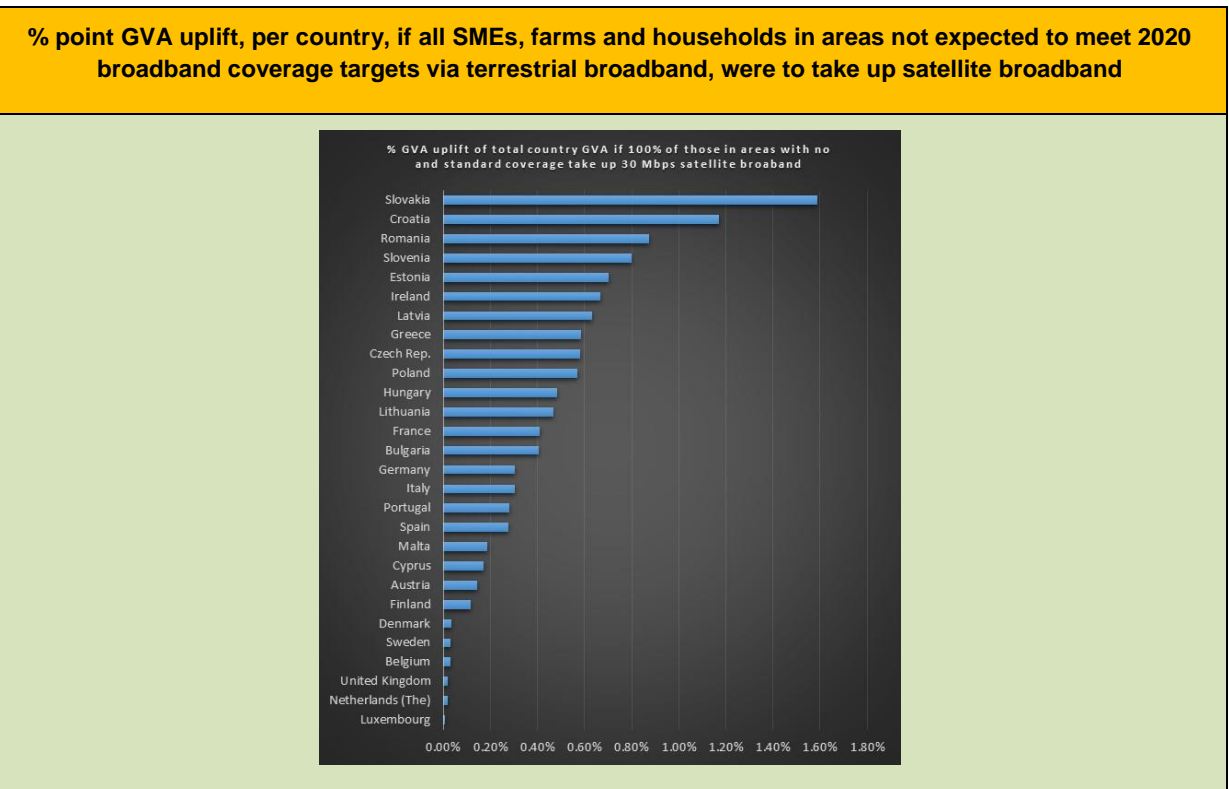
Figure 4.3 ranks the EU28 countries, by size of GVA uplift, showing which countries stand to gain the biggest GVA uplift.

Figure 4.3:



4.6 Even in countries in which the satellite broadband GVA uplift is relatively small, this can still be significant to their overall economy. The following chart shows the percentage point contribution of satellite broadband to total GDP/GVA in each country

Figure 4.4



5. Additional jobs

Satellite broadband could lead to the generation of between 500,000 and 700,000 jobs across the EU28

- 5.1 Wide take up of satellite broadband will also both safeguard and create additional jobs. The literature reviewed in the full technical report shows how increased access to the internet, enabled by broadband, can lead to job creation as well as wealth creation.
- 5.2 To calculate the additional jobs associated with wide take up of satellite broadband the simplest method is to divide GVA-per-Job into the GVA uplift figures. On this basis, the above satellite broadband GVA uplifts translate directly into just over 1m equivalent jobs across the EU28 countries. This is probably an over-estimate however.
- 5.3 GVA uplifts resulting from faster broadband and increased use of the internet do not necessarily translate into similar rates of job increase. In the short term especially, increased use of IT can result in some job-loss or jobless growth, with the gains being focussed on increased efficiency and productivity. These are essential for the competitiveness of the local economy. There will be some job gains but these will need to be offset against job losses and the overall change in the short term may be a marginal increase in jobs but considerable strengthening of productivity and competitiveness, providing the building blocks for growth. In the medium to longer term, the global literature is clear that increased use of IT leads to both additional jobs and higher value jobs.
- 5.4 To estimate actual jobs rather than just equivalent jobs, an appropriate conversion factor is required. We have used two conversion ratios to estimate actual jobs resulting from satellite broadband (GVA-to-job conversion ratios of 50% and of 70%). On this basis, our model estimates that if all SMEs, farms and households in areas expected to have either with no or only standard terrestrial broadband coverage by 2020 were to take up satellite broadband, that this could lead to the generation of between 500,000 and 700,000 jobs

Figure 5.1 provides a breakdown country by country, showing:

- In column 2, the number of jobs which the GVA uplift could translate into if we assume a 1:1 conversion ratio – these are termed equivalent jobs
- The third and fourth columns show the number of jobs that could result if we assume a 50% and a 70% conversion ratio.

Figure 5.1

Additonal jobs associated with satellite broadband GVA uplift			
	<i>Equivalent jobs 1:1</i>	<i>Actual jobs - 50%</i>	<i>Actual jobs - 70%</i>
Austria	7,210	3,605	5,047
Belgium	1,586	793	1,110
Bulgaria	18,425	9,212	12,897
Croatia	26,263	13,132	18,384
Cyprus	804	402	563
Czech Rep.	42,133	21,066	29,493
Denmark	1,051	526	736
Estonia	5,045	2,523	3,532
Finland	3,490	1,745	2,443
France	134,088	67,044	93,862
Germany	149,730	74,865	104,811
Greece	43,778	21,889	30,645
Hungary	27,305	13,652	19,113
Ireland	19,047	9,523	13,333
Italy	120,094	60,047	84,066
Latvia	8,296	4,148	5,807
Lithuania	11,645	5,822	8,151
Luxembourg	35	18	25
Malta	479	240	336
Netherlands (The)	1,806	903	1,264
Poland	120,976	60,488	84,683
Portugal	19,779	9,889	13,845
Romania	96,228	48,114	67,360
Slovakia	53,438	26,719	37,407
Slovenia	9,530	4,765	6,671
Spain	73,888	36,944	51,722
Sweden	1,981	991	1,387
United Kingdom	5,823	2,912	4,076
Total	1,003,955	501,978	702,769

6. Estimating take-up and timing

6.1 No everyone will take up satellite broadband in under-served areas, even if fully promoted and supported. We have therefore modelled two illustrative take-up scenarios:

- Take up scenario 1: If satellite broadband provides 30 Mbps to 35% of all SMEs, farms and households in under-served areas, we estimate this could generate c. 10bn GVA and a quarter of a million jobs across the EU28.
- Take up scenario 2: If however satellite is taken up by 50%, then this could generate 15bn GVA and a third of a million jobs across the EU28.

6.2 Figure 6.1 shows a country by country breakdown of the take up scenario results.

Figure 6.1

Take-up scenario modelling				
	35% take up scenario		50% take up scenario	
	GVA - NPV at 3.5%	Jobs ⁹	GVA - NPV at 3.5%	Jobs
Austria	128,143,533	1,611	183,062,190	2,301
Belgium	32,249,258	354	46,070,368	506
Bulgaria	44,741,390	4,116	63,916,271	5,879
Croatia	149,003,446	5,867	212,862,066	8,381
Cyprus	9,148,442	180	13,069,202	257
Czech Rep.	269,276,958	9,411	384,681,369	13,445
Denmark	24,408,159	235	34,868,799	336
Estonia	32,848,190	1,127	46,925,986	1,610
Finland	63,569,008	780	90,812,868	1,114
France	2,432,580,615	29,952	3,475,115,165	42,789
Germany	2,348,387,314	33,446	3,354,839,020	47,780
Greece	353,875,190	9,779	505,535,985	13,970
Hungary	134,079,794	6,099	191,542,563	8,713
Ireland	329,307,522	4,255	470,439,317	6,078
Italy	1,417,798,292	26,826	2,025,426,131	38,323
Latvia	37,915,995	1,853	54,165,707	2,647
Lithuania	43,026,688	2,601	61,466,697	3,716
Luxembourg	921,069	8	1,315,812	11
Malta	3,612,561	107	5,160,802	153
Netherlands (The)	32,516,959	403	46,452,799	576
Poland	614,790,287	27,023	878,271,838	38,604
Portugal	138,077,332	4,418	197,253,331	6,312
Romania	333,491,961	21,495	476,417,087	30,707
Slovakia	328,170,274	11,937	468,814,678	17,053
Slovenia	83,639,939	2,129	119,485,628	3,041
Spain	879,736,656	16,505	1,256,766,651	23,578
Sweden	36,524,065	443	52,177,236	632
United Kingdom	96,405,026	1,301	137,721,465	1,858
Total	10,398,245,923	224,259	14,854,637,033	320,370

6.3 Further detail of the evidence base, the approach and methodologies used in our modelling and of the results, are provided in the full technical report which will be available on the BRESAT website.

⁹ Jobs have been calculated assuming a 70% GVA to job conversion ratio, and the build-up is spread over a 10 year period, with zero additional jobs assumed in year one, followed by a slow build up

7. Adroit Economics Ltd – who we are, what we do

7.1 Adroit Economics Ltd specialises in the fields of local, regional and national economic development and regeneration.

7.2 Adroit was established by Dr Steve Sheppard in 2006 to work for central and local government, universities and other research organisations, developers, investors and industry. The majority of our work, to date, is UK focussed, with selected international assignments...but much of our UK work involves benchmarking against European and global competition, or promoting the UK globally.

Dr Steve Sheppard, managing director

7.3 Steve has a PhD from the University of Cambridge in the fields of economic development and regeneration. He has worked in industry, academia and consultancy establishing a wealth of experience and knowledge in these fields over the last 25 years. His professional background comprises a hybrid mix of economics, technology, real-estate development, land use planning, social policy and politics – enabling him to see a problem from several different perspectives.

Our mission

7.4 Our mission is to provide high quality research and analysis to enable our clients to make informed choices....and where required, to help our clients make difficult choices through providing innovative and creative advice.

Adroit offers expertise across the life-cycles of strategies, programmes and projects:

- Conceptualisation and strategy formulation
- Market, economic and social research
- Business case making, including options appraisal, economic impact, cost-benefit analysis and financial appraisal
- Project and programme monitoring, interim and final evaluation

Since Adroit's inception in 2006, we have worked on some 90 assignments across a wide spectrum of fields, including:

- **Regional, city region and local economies** – profiling economies, benchmarking performance, identifying key industry and business sectors, formulating growth strategies
- **Industry and business sectors** – mapping strengths and weaknesses, benchmarking, company surveys, identification of growth barriers, formulating of growth strategies
- **Sites and premises** – employment land, business parks, science parks, technology innovation centres – feasibility studies, market demand assessments, financial and economic appraisal, options analysis, funding strategies
- **Science and technology transfer and commercialisation** – internationalisation strategies for key university research teams, regional innovation system policy and evaluation, appraisal and evaluation of specialist research and commercialisation support infrastructure and centres of excellence
- **Inward investment, export and marketing** – industry sector positioning, benchmarking and export/ inward investment marketing strategies and programmes, city and city region promotion and marketing programmes and evaluation
- **Smart and city infrastructure** – for example broadband, new and renewable energy, electric vehicle charging infrastructure

- **Social policy and programmes** – formulation of strategies, options appraisal, interim and final evaluation – of a wide range of social and community programmes regarding, employment, health, security, quality of life and wellbeing
- **European funding** – advice on the economic aspects of state aid and competition policy, preparation of funding submissions, interim and final evaluations
- **Regulatory economics** – economic impact, cost-benefit analysis of proposed changes/ additions to regulation, across a variety of policy spectrums.

Our teams and their expertise

7.5 Adroit Economics offers an unusual, flexible business model and team structure:

- We have a small core
- But are able to call on a large network of experts and other trusted associates

7.6 ...this enables us to create highly experienced teams that provide the precise combinations of expertise required for each assignment.

- Our teams are typically multi-disciplinary in nature
- They typically included industry experts, academics and personnel leading in their respective fields

7.7 Above all, we work in a highly collaborative and creative way.

For further information, please visit our website www.adroit-economics.co.uk

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